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ATTACK DEFENSE

by PentesterAcademy

Name	Scanning Web Application with ZAPProxy
URL	https://attackdefense.com/challengedetails?cid=1888
Type	Webapp Pentesting Basics

Important Note: This document illustrates all the important steps required to complete this lab. This is by no means a comprehensive step-by-step solution for this exercise. This is only provided as a reference to various commands needed to complete this exercise and for your further research on this topic. Also, note that the IP addresses and domain names might be different in your lab.

Objective: Scan the web application with ZAPProxy and identify the possible vulnerabilities.

Step 1: Identifying IP address of the target machine

Command: ip addr

```
root@attackdefense:~# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
25097: eth0@if25098: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:0a:01:01:04 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.1.1.4/24 brd 10.1.1.255 scope global eth0
        valid_lft forever preferred_lft forever
25100: eth1@if25101: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:c0:d2:8d:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 192.210.141.2/24 brd 192.210.141.255 scope global eth1
        valid_lft forever preferred_lft forever
root@attackdefense:~#
```

The IP address of the attacker machine is 192.210.141.2. The target machine is located at the IP address 192.210.141.3

Step 2: Identifying open ports.

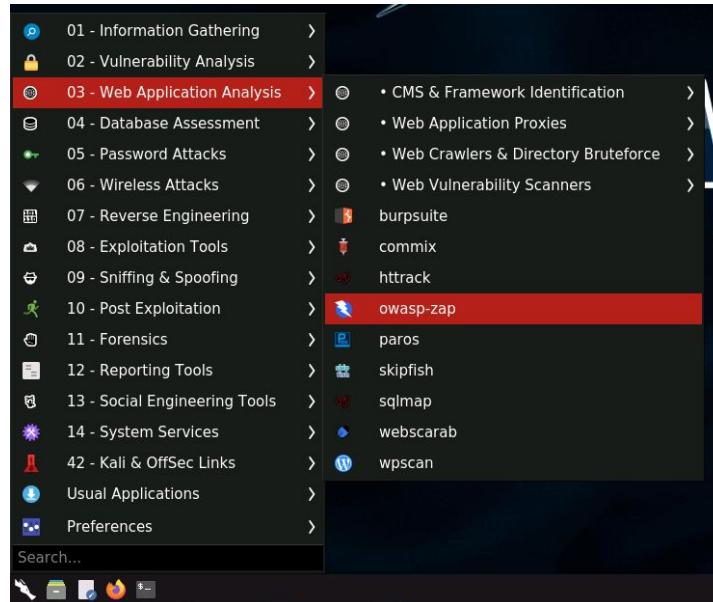
Command: nmap 192.210.1413

```
root@attackdefense:~# nmap 192.210.141.3
Starting Nmap 7.70 ( https://nmap.org ) at 2020-05-21 07:03 IST
Nmap scan report for target-1 (192.210.141.3)
Host is up (0.000013s latency).
Not shown: 998 closed ports
PORT      STATE SERVICE
80/tcp    open  http
3306/tcp  open  mysql
MAC Address: 02:42:C0:D2:8D:03 (Unknown)

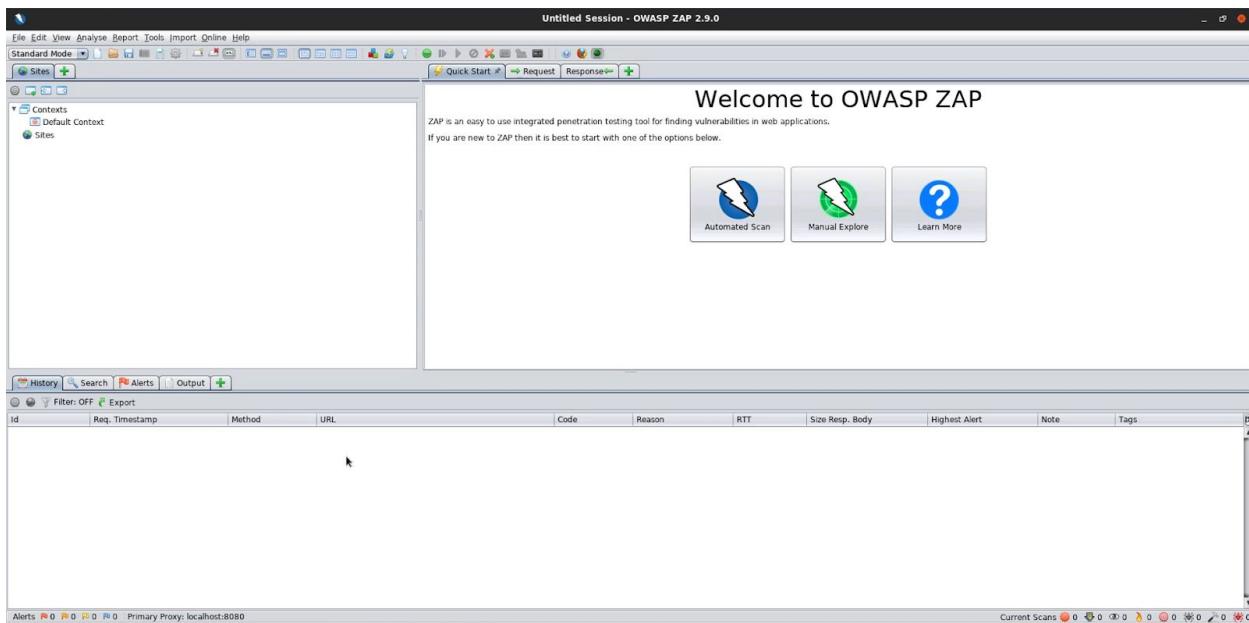
Nmap done: 1 IP address (1 host up) scanned in 0.25 seconds
root@attackdefense:~#
```

Port 80 and 3306 are open.

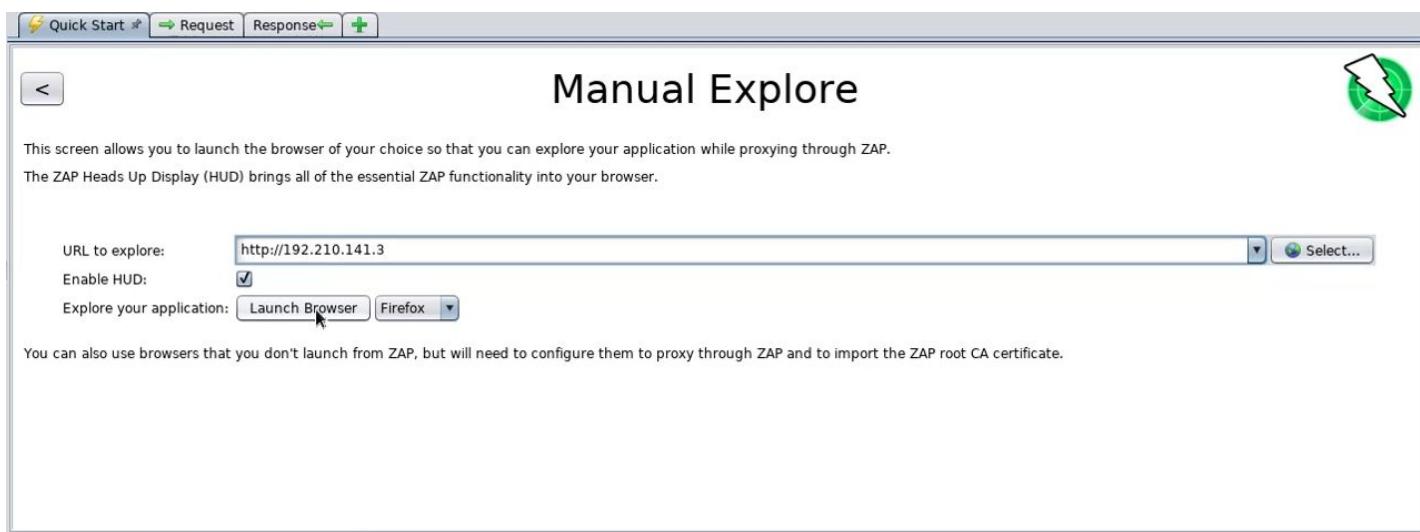
Step 3: Starting Burp Suite. Click on the Menu, Navigate to "Web Application Analysis" and click on "owasp-zap".



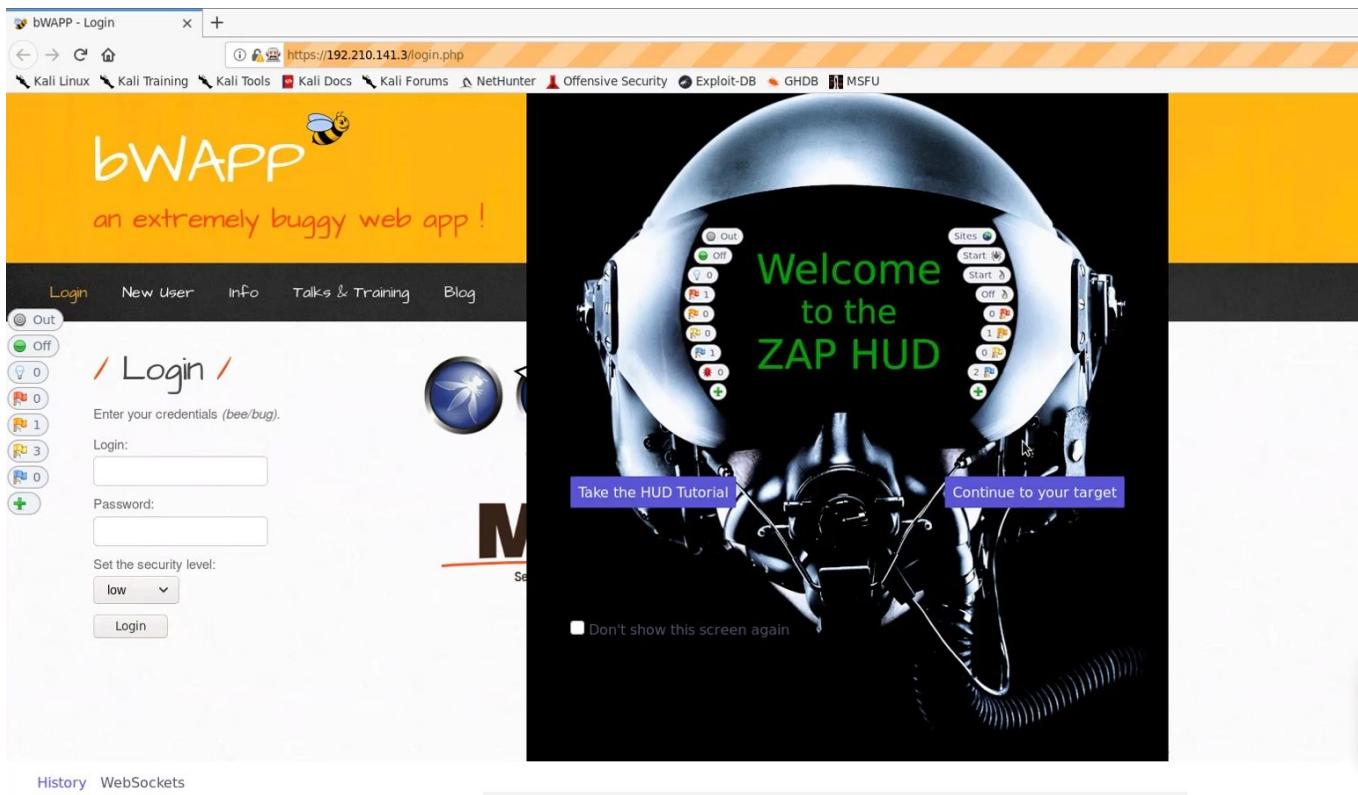
ZAP:



Step 4: Click on "Manual Explore", enter the target IP address in the Input field and click on "Launch Browser".

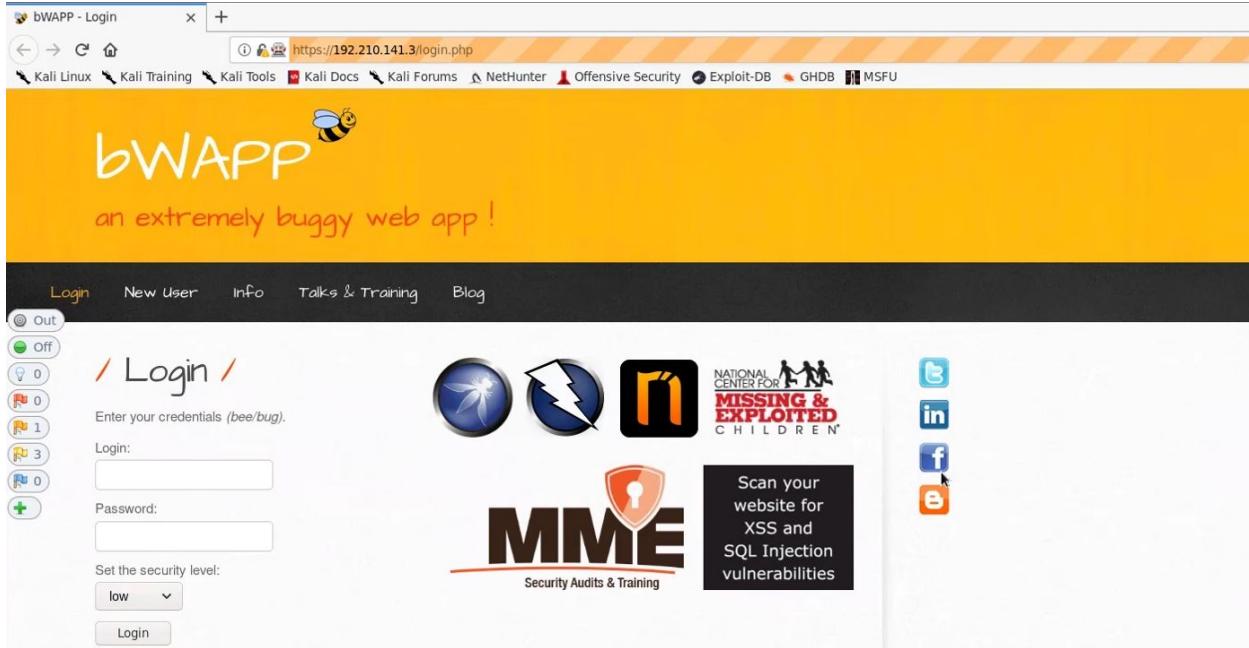


A browser session will be started with ZAP HUD.



History WebSockets

Step 5: Click on "Continue to your target".



Step 6: Login to the web application, the login credentials are mentioned on the login page.

Username: bee

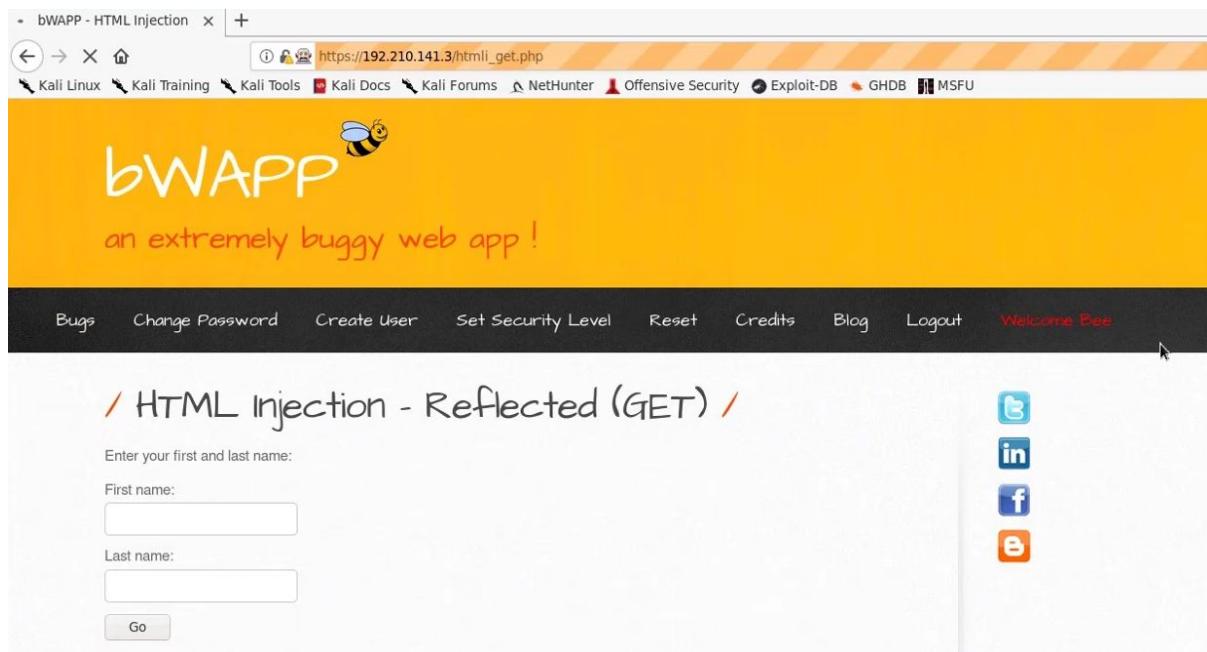
Password: bug



Step 7: Access various web pages. From the Choose your bug dropdown, select "HTML Injection - Reflected (GET)" and click on the Hack button.



HTML Injection - Reflected (GET):



bWAPP - HTML Injection

https://192.210.141.3/htmli_get.php

Kali Linux Kali Training Kali Tools Kali Docs Kali Forums NetHunter Offensive Security Exploit-DB GHDB MSFU

bWAPP

an extremely buggy web app!

Bugs Change Password Create User Set Security Level Reset Credits Blog Logout Welcome Bee

/ HTML Injection - Reflected (GET) /

Enter your first and last name:

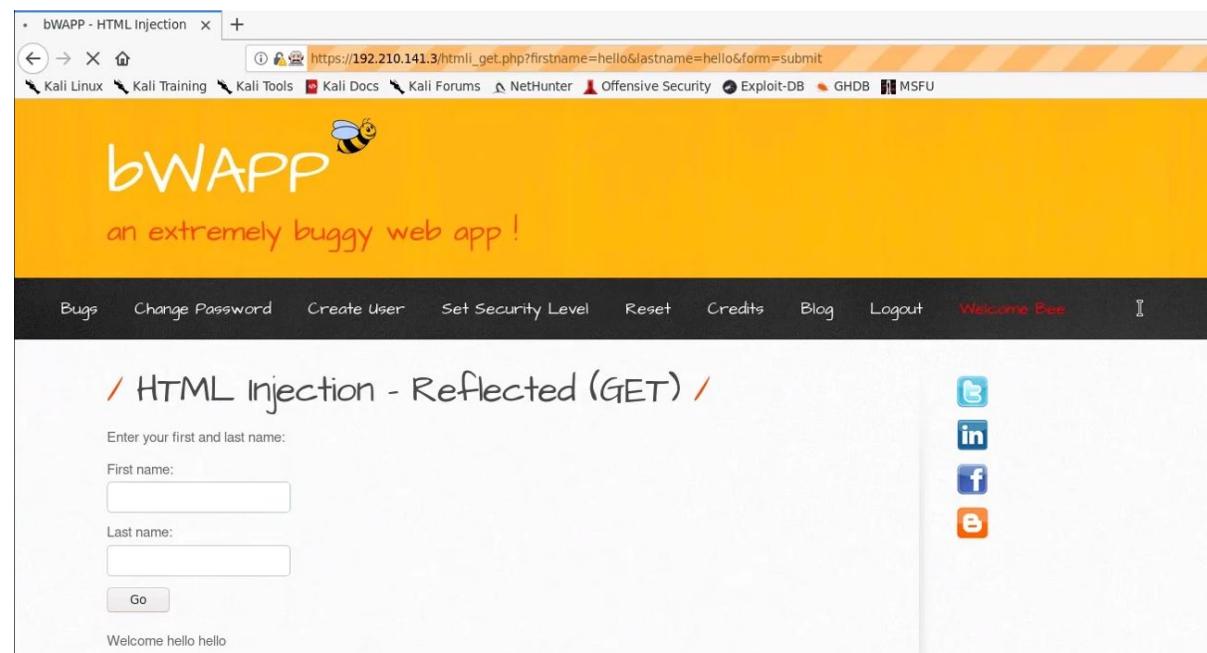
First name:

Last name:

Go

[Twitter](#) [LinkedIn](#) [Facebook](#) [Email](#)

Step 8: Enter any values in the input field and click Go



bWAPP - HTML Injection

https://192.210.141.3/htmli_get.php?firstname=hello&lastname=hello&form=submit

Kali Linux Kali Training Kali Tools Kali Docs Kali Forums NetHunter Offensive Security Exploit-DB GHDB MSFU

bWAPP

an extremely buggy web app!

Bugs Change Password Create User Set Security Level Reset Credits Blog Logout Welcome Bee

/ HTML Injection - Reflected (GET) /

Enter your first and last name:

First name:

Last name:

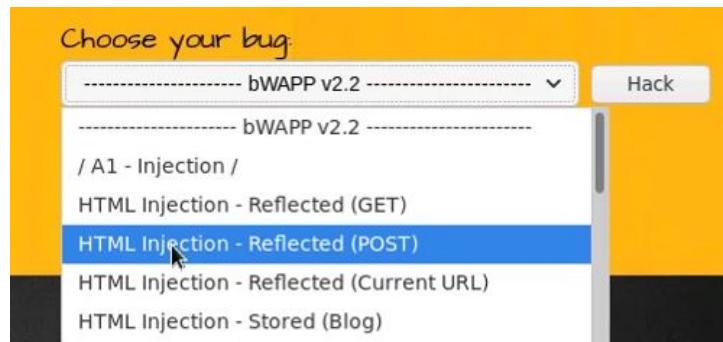
Go

Welcome hello hello

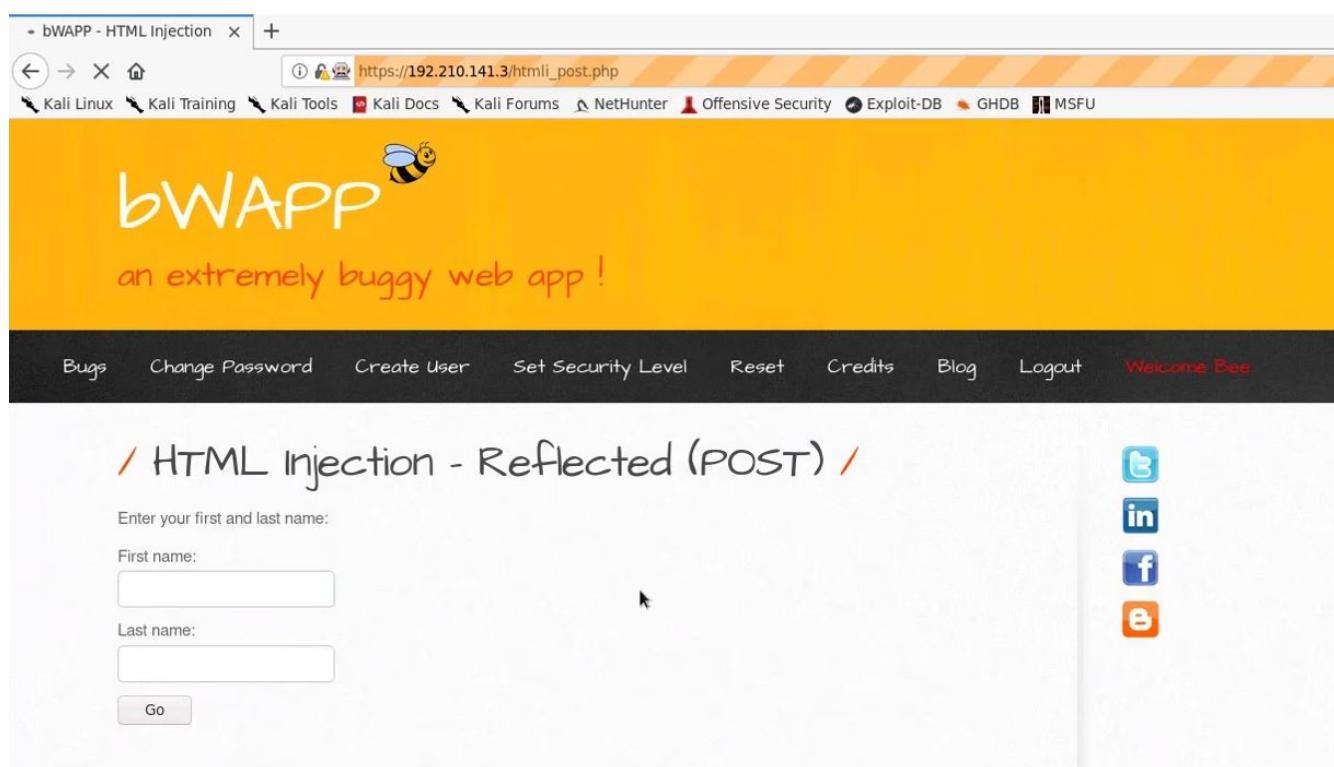
[Twitter](#) [LinkedIn](#) [Facebook](#) [Email](#)

The entered input will appear below the Go button

Step 9: From the Choose your bug dropdown, Select "HTML Injection - Reflected (POST)" and click on the Hack button.



HTML Injection - Reflected (POST)



The screenshot shows the bWAPP web application interface. At the top, a navigation bar includes links for Kali Linux, Kali Training, Kali Tools, Kali Docs, Kali Forums, NetHunter, Offensive Security, Exploit-DB, GHDB, and MSFU. The main header features the bWAPP logo with a bee icon and the tagline "an extremely buggy web app!". Below the header, a navigation bar contains links for Bugs, Change Password, Create User, Set Security Level, Reset, Credits, Blog, Logout, and a "Welcome Bee" message. The main content area is titled "/ HTML Injection - Reflected (POST) /". It contains a form with fields for "First name:" and "Last name:", both represented by input fields. A "Go" button is located below the input fields. To the right of the form, there are social media sharing icons for Twitter, LinkedIn, Facebook, and Email.

Step 10: Enter any values in the input field and click Go

bWAPP - HTML Injection

https://192.210.141.3/htmli_post.php

Kali Linux Kali Training Kali Tools Kali Docs Kali Forums NetHunter Offensive Security Exploit-DB GHDB MSFU

bWAPP

an extremely buggy web app !

Bugs Change Password Create User Set Security Level Reset Credits Blog Logout Welcome Bee

Out

Off

0

0

1

3

0

+ 1

/ HTML Injection - Reflected (POST) /

Enter your first and last name:

First name:

Last name:

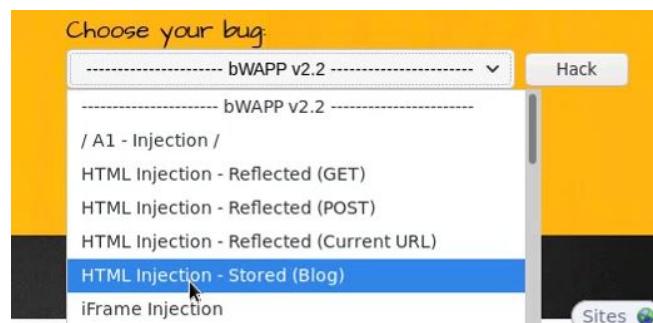
Go

Welcome hello hello

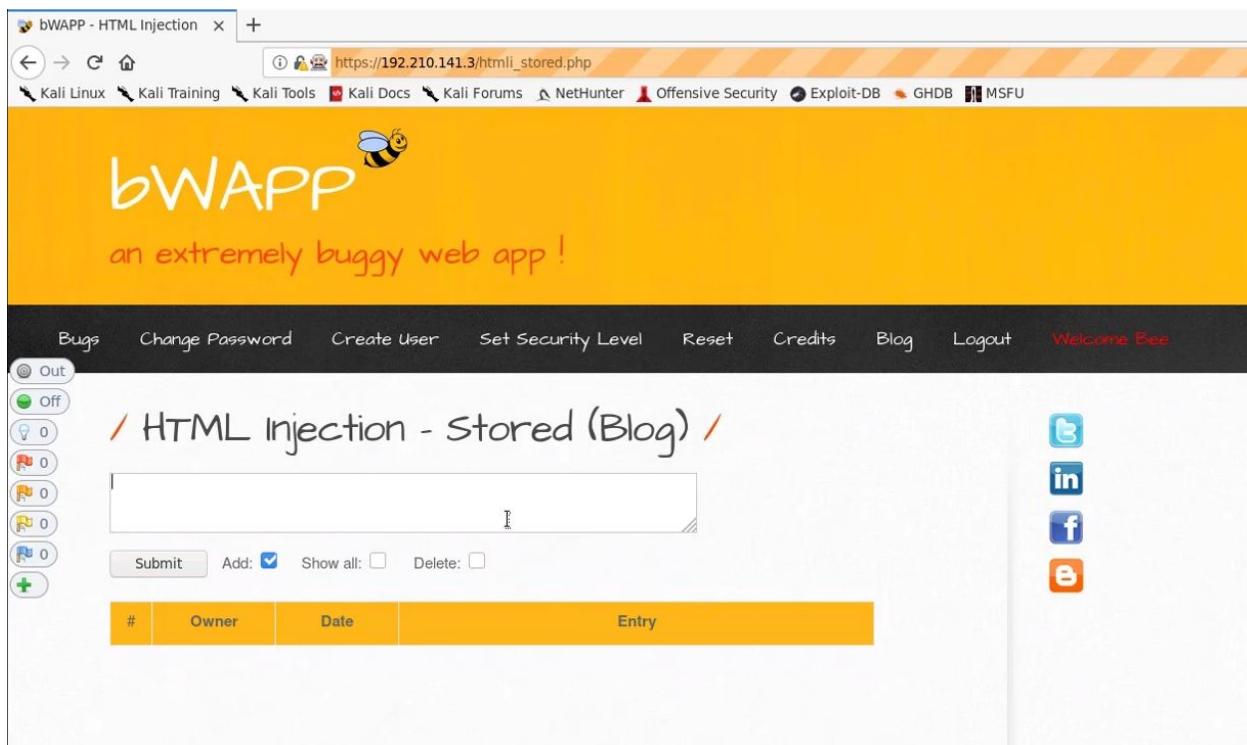
[Twitter](#) [LinkedIn](#) [Facebook](#) [Email](#)

The entered input will appear below the Go button

Step 11: From the Choose your bug dropdown, Select "HTML Injection - Stored (Blog)" and click on the Hack button.

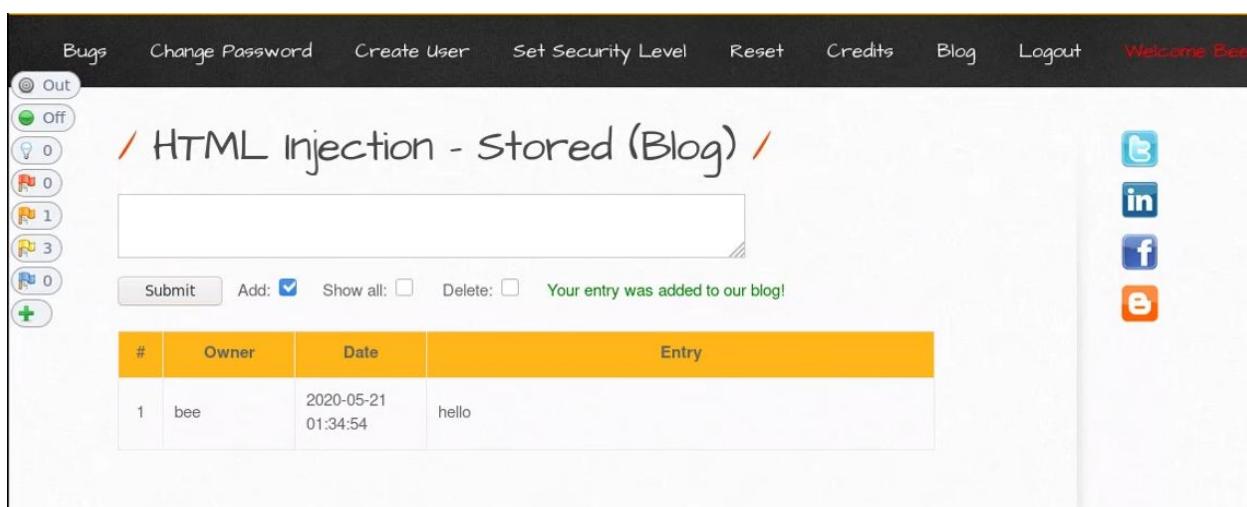


Step 12: Enter any values in the input field and click Submit.



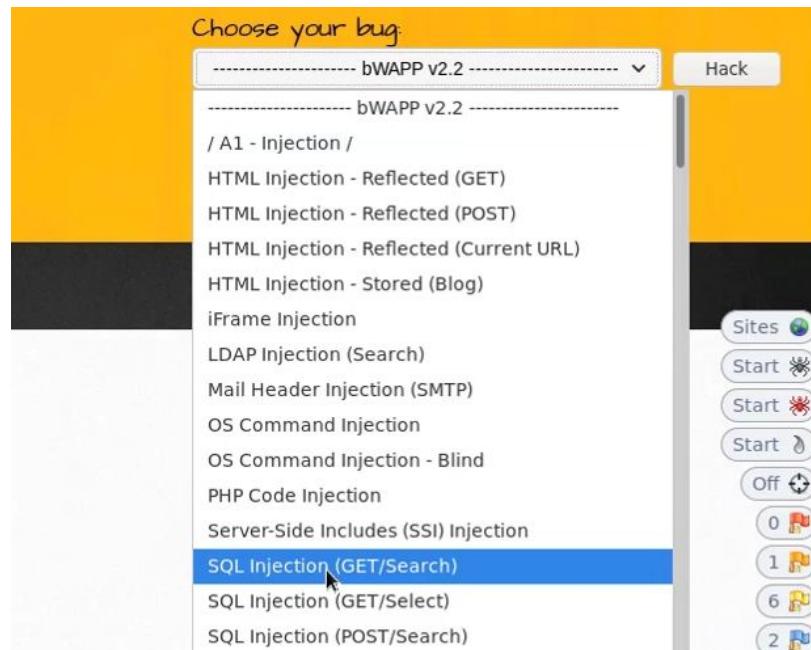
The screenshot shows the bWAPP web application interface. At the top, there is a navigation bar with links to Kali Linux, Kali Training, Kali Tools, Kali Docs, Kali Forums, NetHunter, Offensive Security, Exploit-DB, GHDB, and MSFU. Below the navigation bar is a yellow header with the bWAPP logo and the text "an extremely buggy web app!". The main content area has a title "HTML Injection - Stored (Blog)". There is a text input field with a placeholder "Type your blog entry here". Below the input field are buttons for "Submit", "Add: ", "Show all: ", and "Delete: ". To the right of the input field are social media sharing icons for Twitter, LinkedIn, Facebook, and Email. At the bottom, there is a table with columns for "#", "Owner", "Date", and "Entry". The table currently contains one row with the value "1" in the "#" column, "bee" in the "Owner" column, "2020-05-21 01:34:54" in the "Date" column, and "hello" in the "Entry" column.

The entered value will appear in the table.



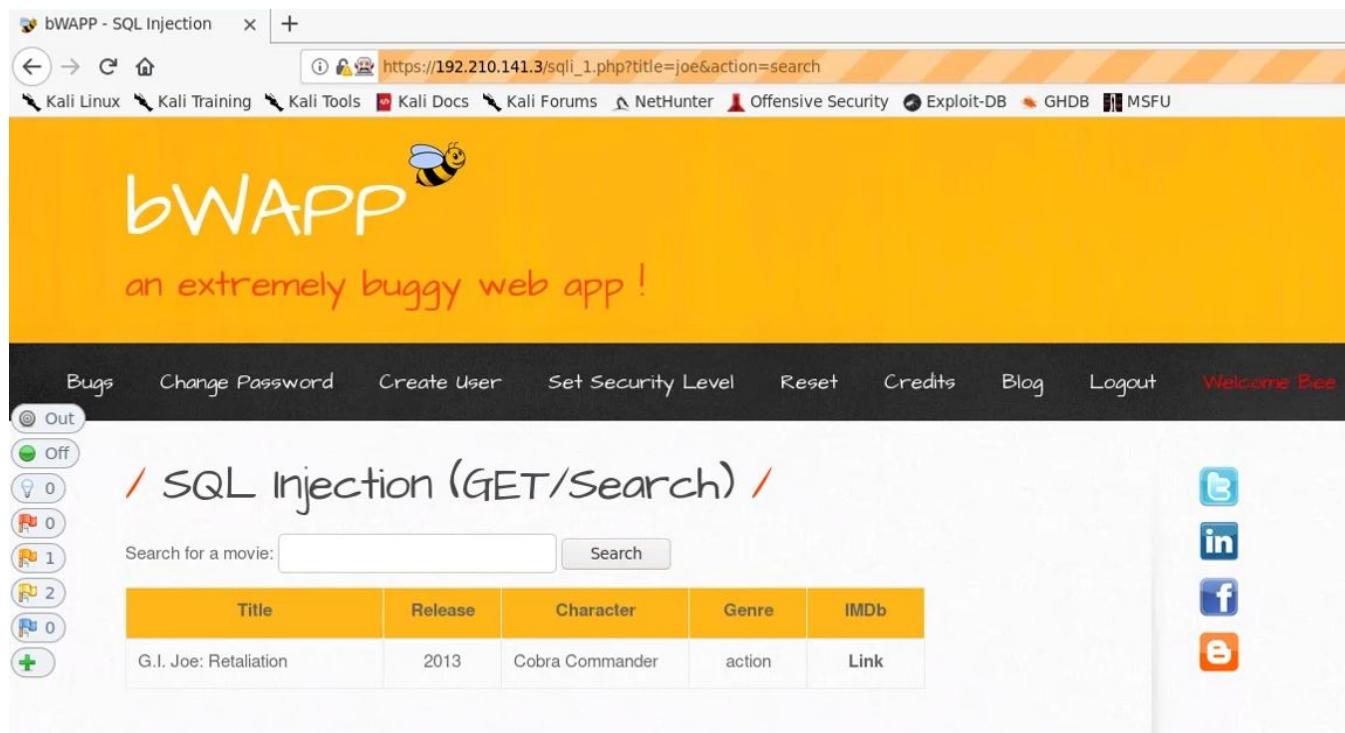
The screenshot shows the bWAPP web application interface. The layout is identical to the previous screenshot, but the table now contains a single row with the value "1" in the "#" column, "bee" in the "Owner" column, "2020-05-21 01:34:54" in the "Date" column, and "hello" in the "Entry" column. Additionally, there is a green message at the bottom of the table row stating "Your entry was added to our blog!".

Step 13: From the Choose your bug dropdown, Select "SQL Injection (GET/Search)" and click on the Hack button.



SQL Injection (GET/Search)

Step 14: Enter "Joe" and click on the Search button.



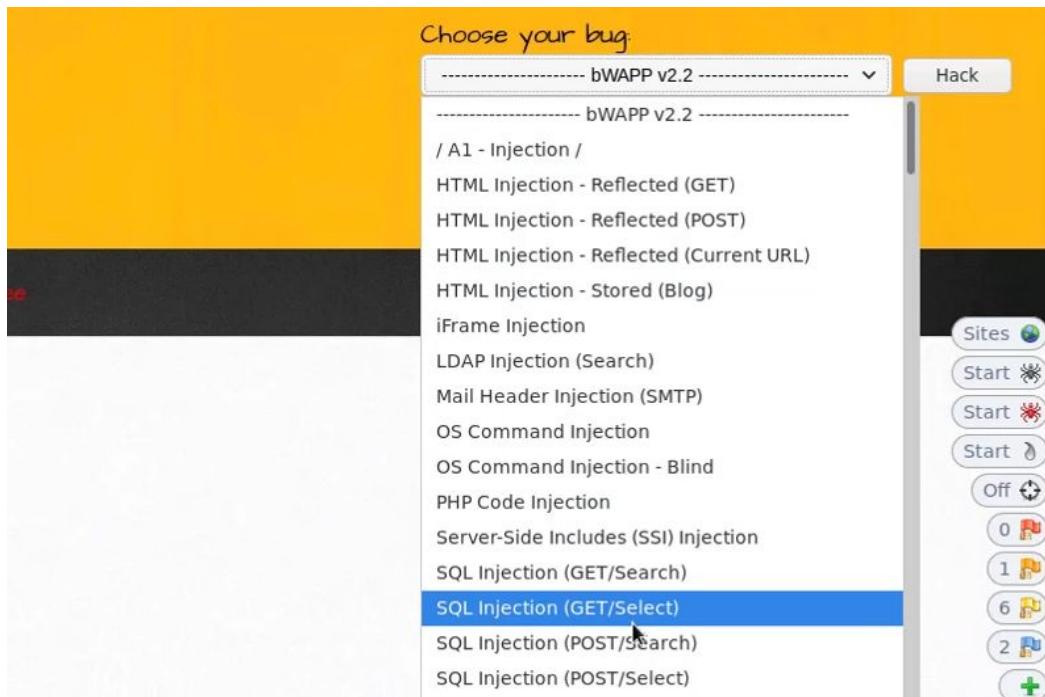
The screenshot shows the bWAPP web application interface. The title bar indicates the URL is https://192.210.141.3/sqli_1.php?title=joe&action=search. The main content area features a yellow header with the text "bwAPP" and a bee icon, followed by the tagline "an extremely buggy web app!". Below the header is a navigation bar with links: Bugs, Change Password, Create User, Set Security Level, Reset, Credits, Blog, Logout, and Welcome Bee. On the left, there is a sidebar with various status icons: Out (blue), Off (green), 0 (grey), 0 (grey), 1 (red), 2 (yellow), 0 (grey), and + (green). The central part of the page is titled "/ SQL Injection (GET/Search) /". It contains a search form with the placeholder "Search for a movie:" and a "Search" button. Below the form is a table with the following data:

Title	Release	Character	Genre	IMDb
G.I. Joe: Retaliation	2013	Cobra Commander	action	Link

On the right side, there are social media sharing icons for Twitter, LinkedIn, Facebook, and Email.

1 result will appear.

Step 15: From the Choose your bug dropdown, Select "SQL Injection (GET>Select)" and click on the Hack button.



SQL Injection (GET>Select)

Step 16: "G.I. Joe: Retaliation" is the default selected option. Click on the "Select" button.

The screenshot shows a web application interface. At the top, it says "SQL Injection (GET>Select)". Below that is a dropdown menu with "G.I. Joe: Retaliation" selected and a "Go" button. A table follows, with the first row having a yellow header. The data row contains: G.I. Joe: Retaliation (Title), 2013 (Release), Cobra Commander (Character), action (Genre), and a "Link" button (IMDb).

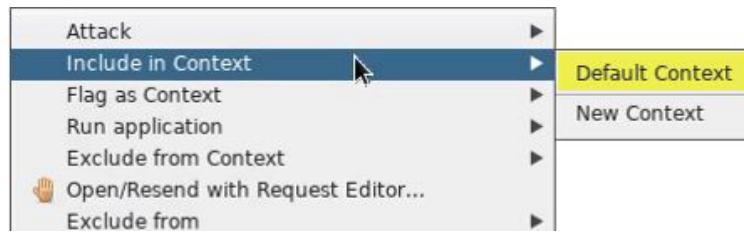
Title	Release	Character	Genre	IMDb
G.I. Joe: Retaliation	2013	Cobra Commander	action	Link

1 result will appear.

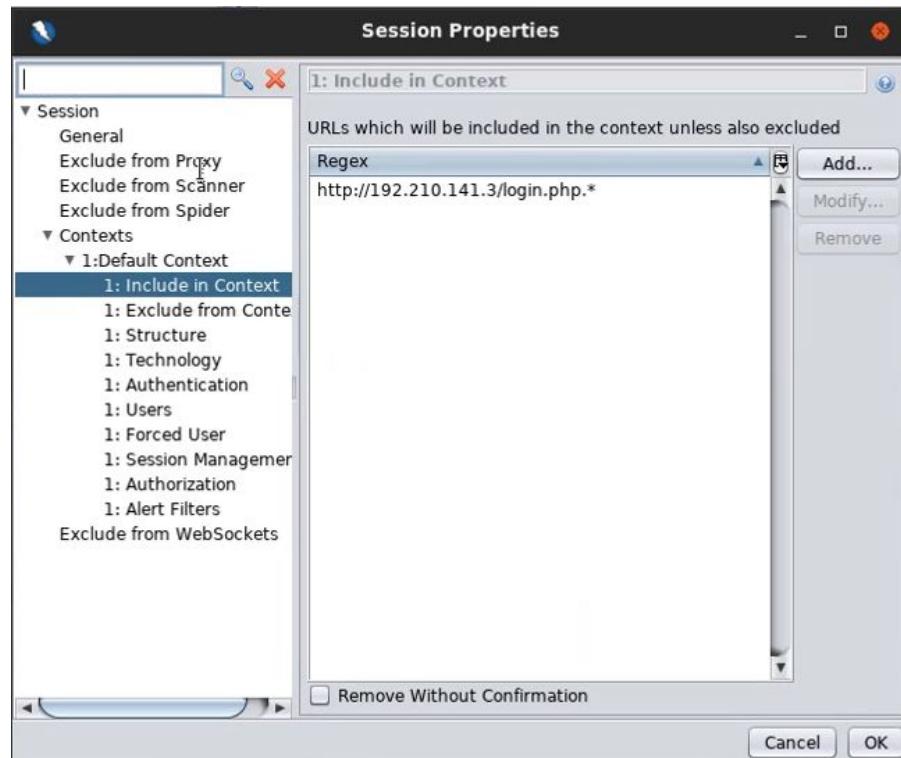
Step 17: Configuring ZAPProxy to use authenticated session. In ZAPProxy, navigate to the sitemap and find the login request.

The screenshot shows the ZAPProxy interface in "Standard Mode". The "Sites" tab is selected. The sitemap pane shows a list of requests and files. A POST request to "POST:login.php(form,login,password,security_level)" is highlighted with a blue bar, indicating it is selected. Other requests listed include GET:htmli_get.php(firstname,form,lastname), GET:htmli_post.php, POST:htmli_post.php(bug,form_bug), POST:htmli_post.php(firstname,form,lastname), GET:htmli_stored.php, POST:htmli_stored.php(blog,entry,entry_add), POST:htmli_stored.php(bug,form_bug), images, js, GET:login.php, GET:portal.php, POST:portal.php(bug,form_bug), GET:sql1_1.php, GET:sql1_1.php(action,title), POST:sql1_1.php(bug,form_bug), GET:sql1_2.php, and GET:sql1_2.php(action,movie). There is also a stylesheets folder.

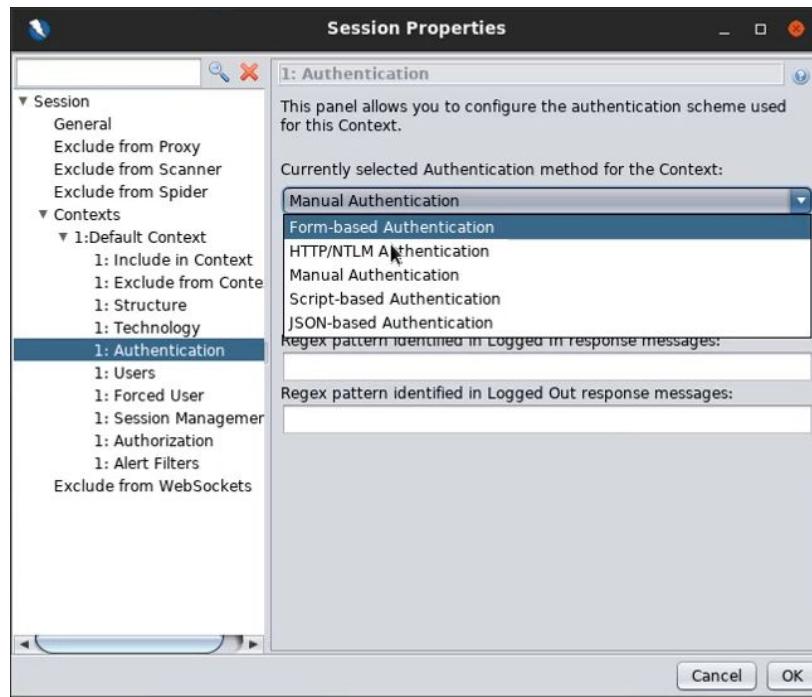
Step 18: Right click on the POST request, navigate to "Include in Context" and select on "Default Context".



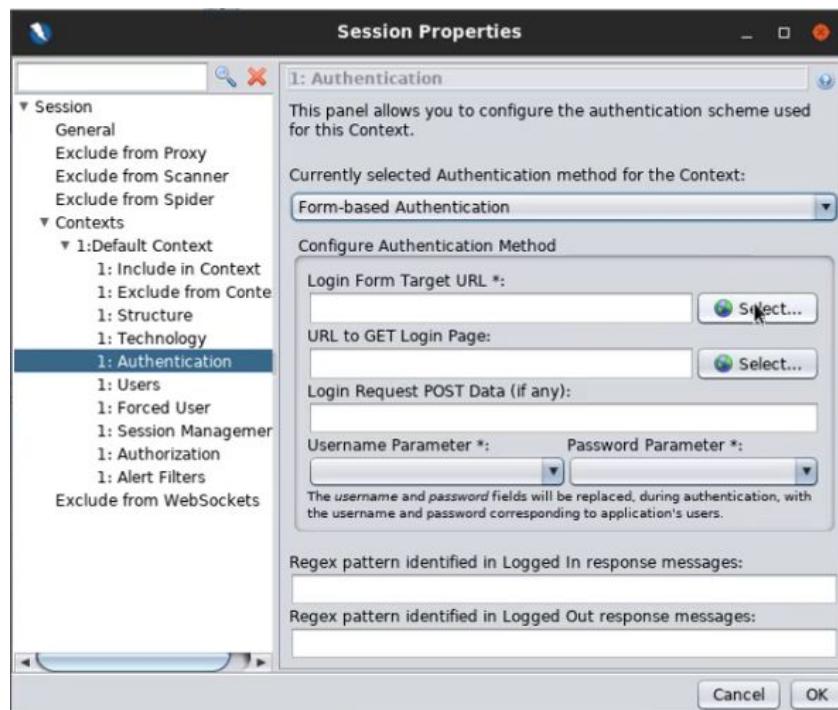
The session Properties window will appear.



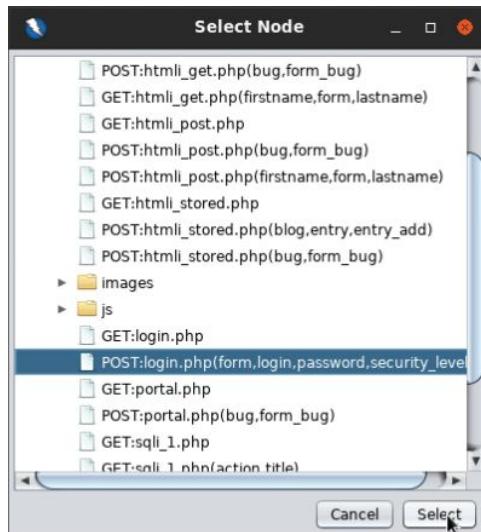
Step 19: Click on the Authentication tab under Default Context menu and select "Form-based Authentication" for the selected method.



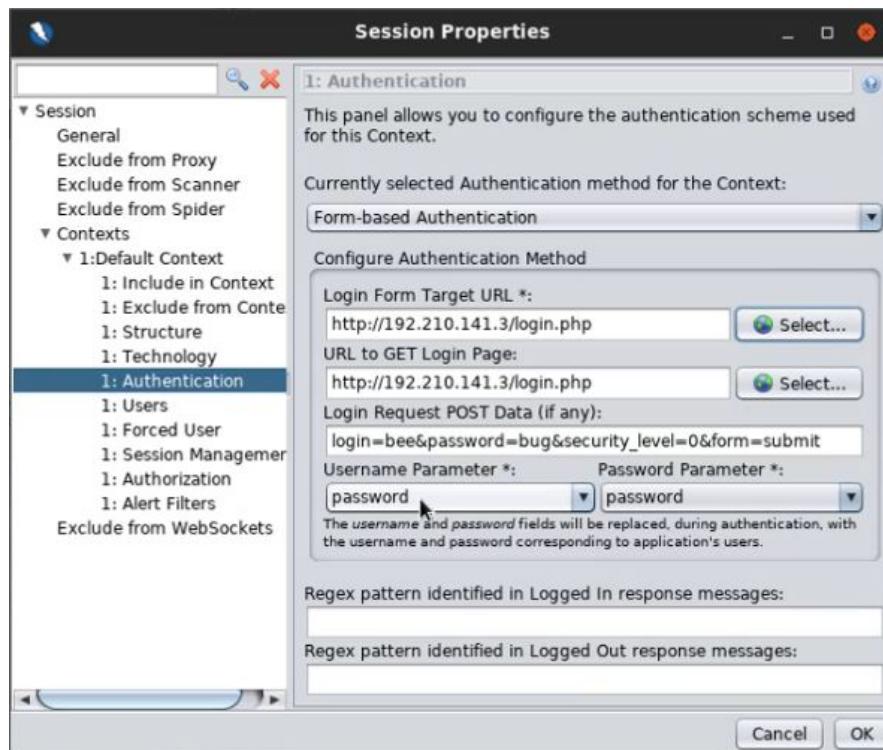
Authentication Section:



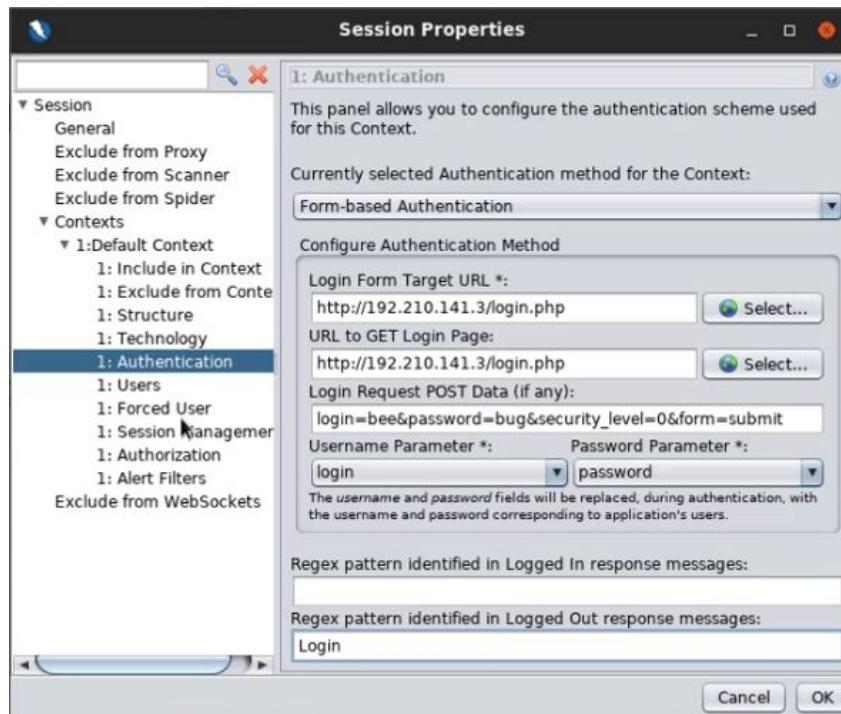
Step 20: Click on the Select button and select the POST login request.



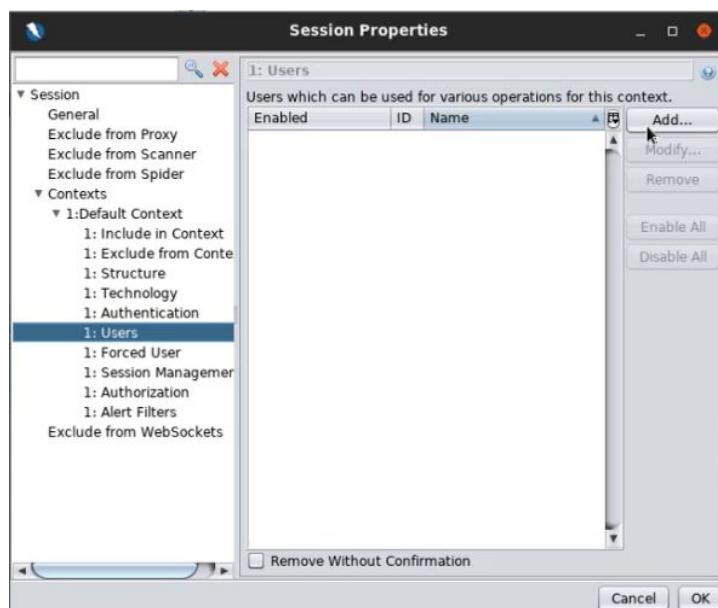
The form fields will automatically be filled.



Step 21: Set the Username parameter to "login" and Enter "Login" in the "Regex pattern identified in Logged Out response messages".



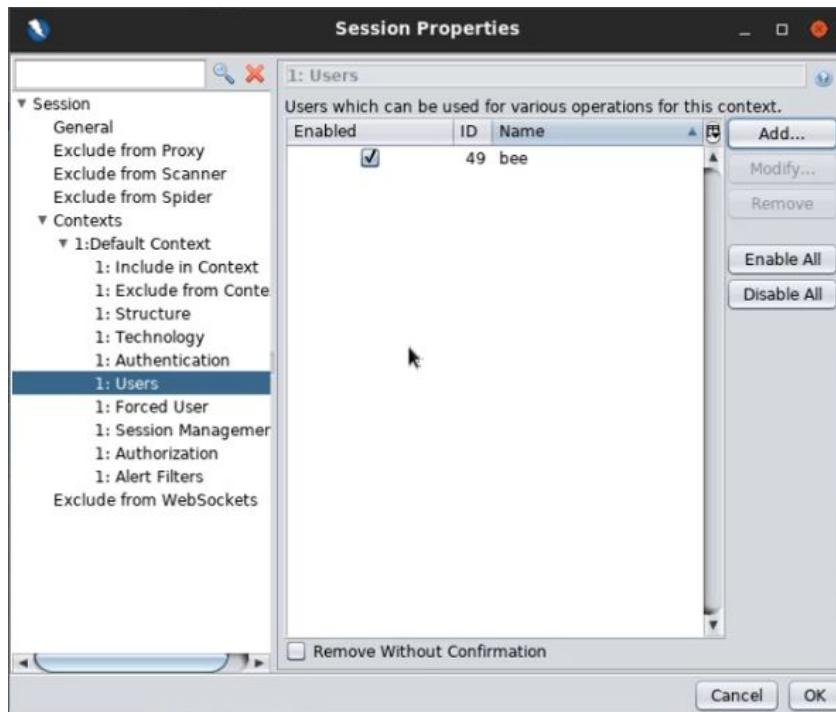
Step 22: Click on the Users tab.



Step 23: Click on the "Add" button and add a new user with username "bee" and password "bug"



Step 24: Click on the "OK" button.

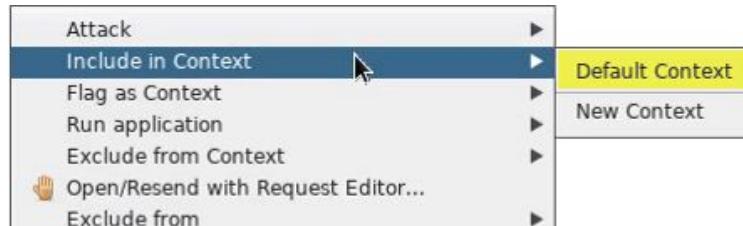


Step 25: Click on the User lock icon.

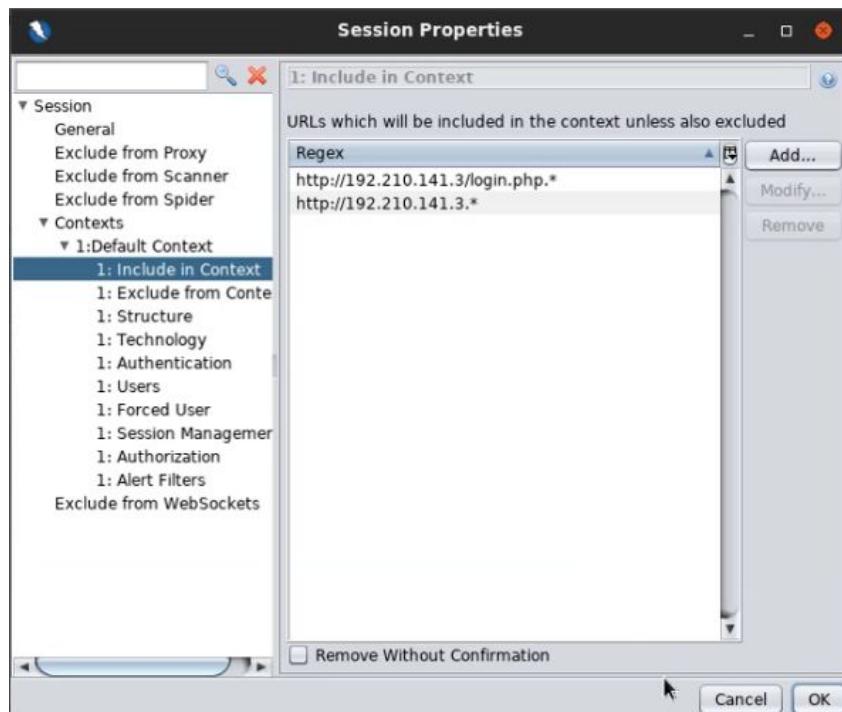


This screen allows you to launch the browser of your choice so that you can

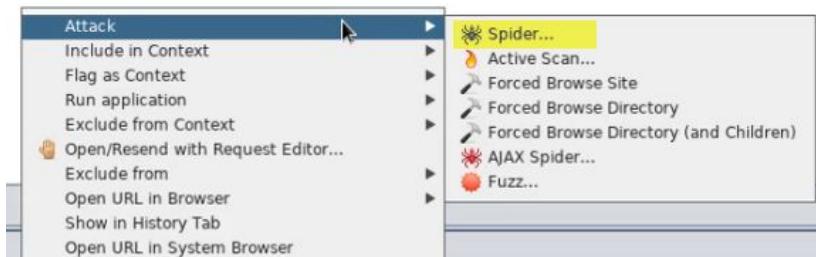
Step 26: Right click on the Site (<http://192.210.141.3>), navigate to "Include in Context" and select on "Default Context".



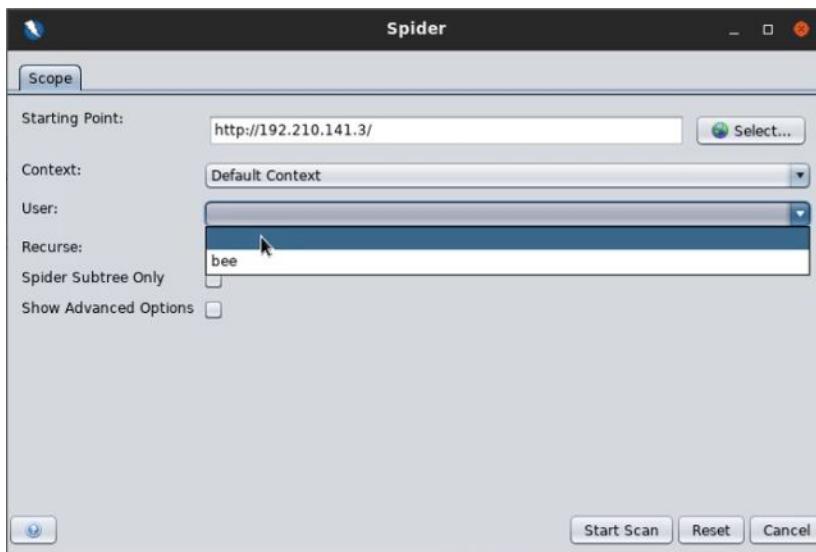
Session Properties window will appear.



Step 27: Click on the "OK" button. Right click on the Site (<http://192.210.141.3>), navigate to Attack and select "Spider".



Step 28: A dialog box will appear, select the "bee" user and click on "Start Scan" button.



Scan Result:

Manual Explore

This screen allows you to launch the browser of your choice so that you can explore your application while proxying through ZAP. The ZAP Heads Up Display (HUD) brings all of the essential ZAP functionality into your browser.

URL to explore: Enable HUD:

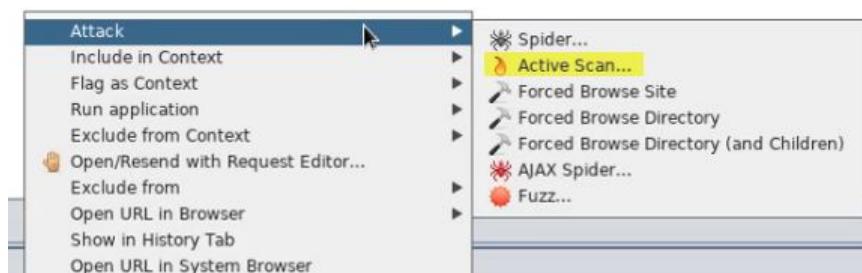
You can also use browsers that you don't launch from ZAP, but will need to configure them to proxy through ZAP and to import the ZAP root CA

Processed	Method	URI	Flags
	GET	http://192.210.141.3/js/?C=N;O=A	
	GET	http://192.210.141.3/js/?C=M;O=D	
	GET	http://192.210.141.3/js/?C=S;O=D	
	GET	http://192.210.141.3/js/?C=D;O=D	
	GET	http://www.json.org/json2.js	Out of Context
	GET	http://www.json.org/json.html	Out of Context
	GET	http://jquery.com/	Out of Context
	GET	http://jquery.org/license	Out of Context
	GET	http://sizzlejs.com/	Out of Context
	GET	http://javascript.crockford.com/jsmin.html	Out of Context
	GET	http://192.210.141.3/stylesheets/?C=N;O=A	
	GET	http://192.210.141.3/stylesheets/?C=M;O=D	
	GET	http://192.210.141.3/stylesheets/?C=S;O=D	
	GET	http://192.210.141.3/stylesheets/?C=D;O=D	

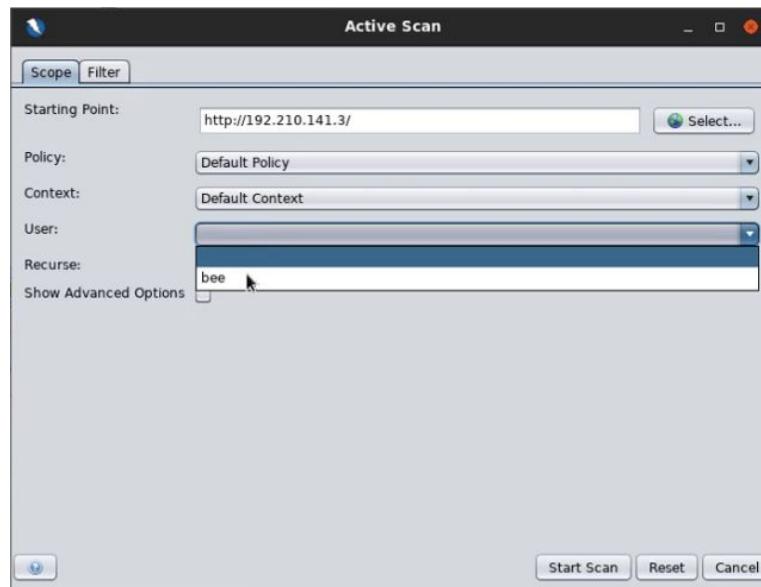
Alerts 0 2 6 2 Primary Proxy: localhost:8080 Current Scans: 0 URLs Found: 202 Nodes Added: 81 Export

202 URLs were found.

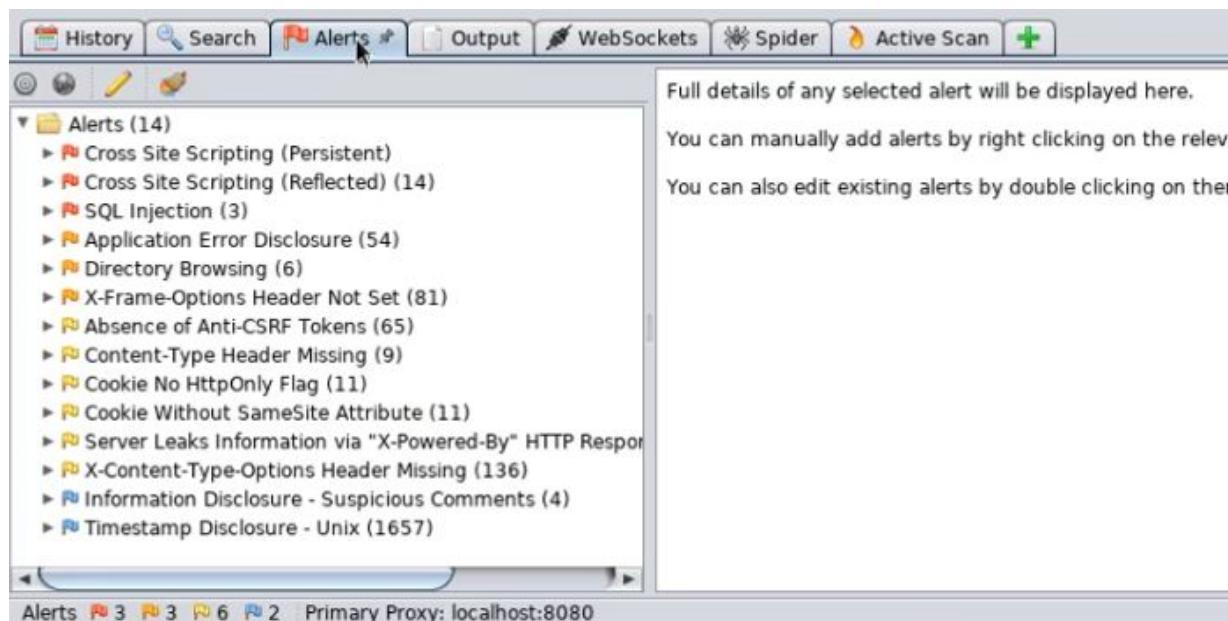
Step 29: Right click on the Site (<http://192.210.141.3>), navigate to Attack and select "Active Scan".



Step 30: A dialog box will appear, select the "bee" user and click on "Start Scan" button.



Step 31: After the scan completes, click on the "Alerts" tab.



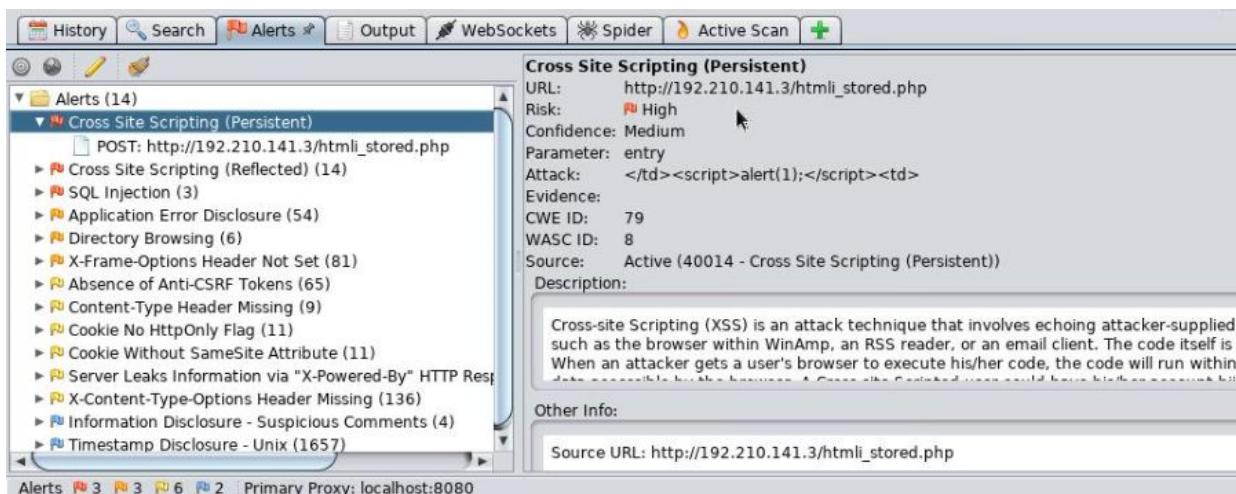
Full details of any selected alert will be displayed here.
You can manually add alerts by right clicking on the relev: [Add Alert](#)
You can also edit existing alerts by double clicking on ther [Edit Alert](#)

Alert Type	Count
Critical	3
High	3
Medium	6
Low	2

Primary Proxy: localhost:8080

There are 3 critical alerts.

Step 32: Click on Cross Site Scripting (Persistent)



The screenshot shows the OWASP ZAP interface. The top navigation bar includes History, Search, Alerts, Output, WebSockets, Spider, Active Scan, and a plus sign for new tabs. The main window displays an alert titled 'Cross Site Scripting (Persistent)' with the following details:

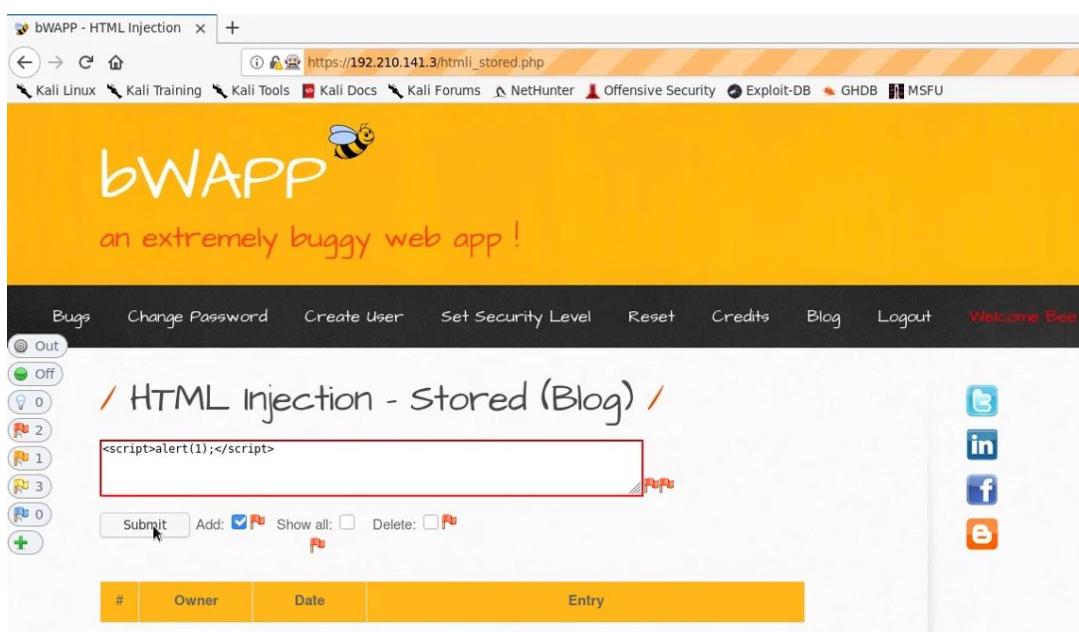
- URL: http://192.210.141.3/html_stored.php
- Risk: High
- Confidence: Medium
- Parameter: entry
- Attack: `</td><script>alert(1);</script><td>`
- Evidence:
- CWE ID: 79
- WASC ID: 8
- Source: Active (40014 - Cross Site Scripting (Persistent))
- Description: Cross-site Scripting (XSS) is an attack technique that involves echoing attacker-supplied data back to the user, such as the browser within WinAmp, an RSS reader, or an email client. The code itself is usually JavaScript. When an attacker gets a user's browser to execute his/her code, the code will run within the user's session, giving the attacker full control over the user's session.
- Other Info:
- Source URL: http://192.210.141.3/html_stored.php

At the bottom of the interface, there are buttons for Alerts (3), Issues (3), Risks (6), and Tools (2), along with a note about the Primary Proxy: localhost:8080.

The information regarding the URL, payload, description about the vulnerability will be displayed.

Step 33: Navigate to the URL, Inject the XSS payload and click on Submit button.

URL: http://192.210.141.3/html_stored.php

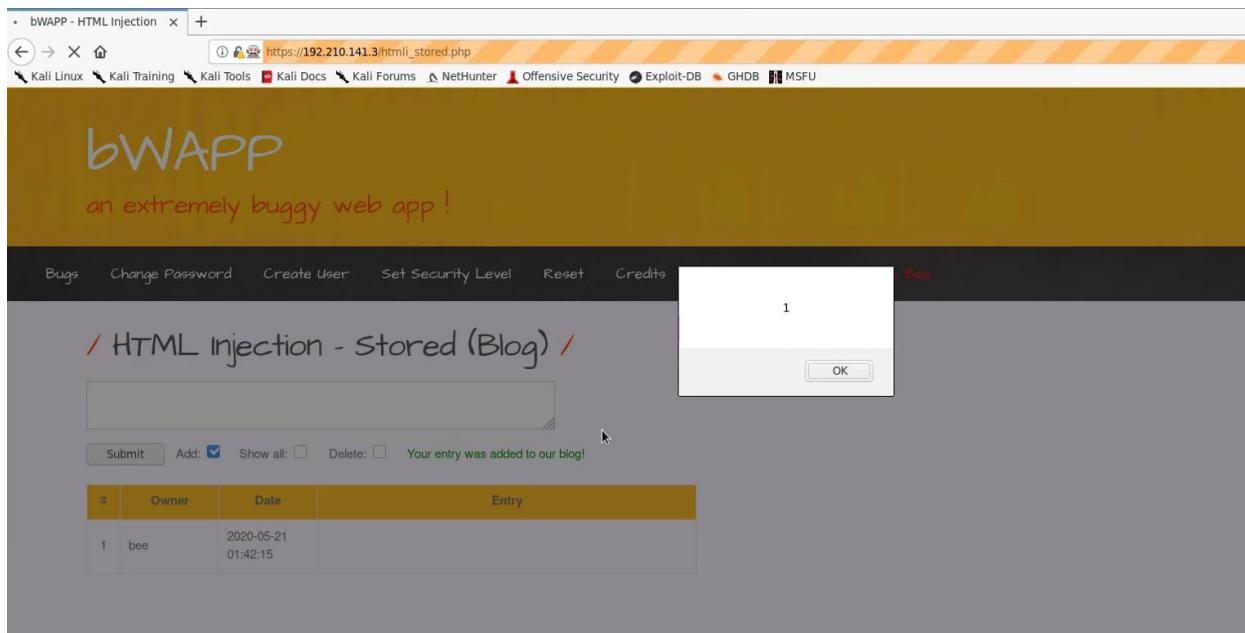


The screenshot shows the bWAPP web application. The top navigation bar includes links for Kali Linux, Kali Training, Kali Tools, Kali Docs, Kali Forums, NetHunter, Offensive Security, Exploit-DB, GHDB, and MSFU. The main content area features a yellow header with the text 'bWAPP' and 'an extremely buggy web app !'. Below the header is a navigation bar with links for Bugs, Change Password, Create User, Set Security Level, Reset, Credits, Blog, Logout, and 'Welcome Bee'. The main content area displays a blog entry titled '/ HTML Injection - Stored (Blog) /' with the following details:

- Bugs: 0
- Off: 0
- High: 2
- Medium: 1
- Low: 3
- Info: 0

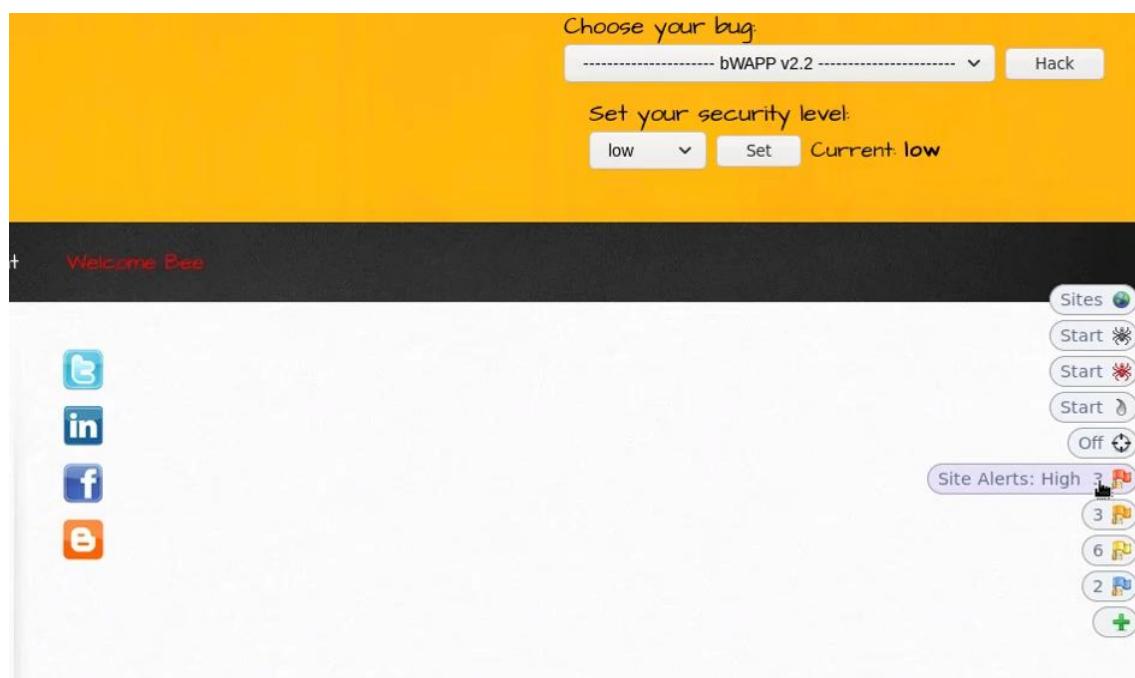
The blog entry content is a text box containing the XSS payload: `<script>alert(1);</script>`. Below the text box are buttons for 'Submit' (with a cursor icon), 'Add' (with a checked checkbox), 'Show all' (with an unchecked checkbox), and 'Delete' (with a checked checkbox). To the right of the text box are social media sharing icons for Twitter, LinkedIn, Facebook, and Email. At the bottom of the blog entry is a table with columns for '#', 'Owner', 'Date', and 'Entry'.

The XSS payload will be triggered.



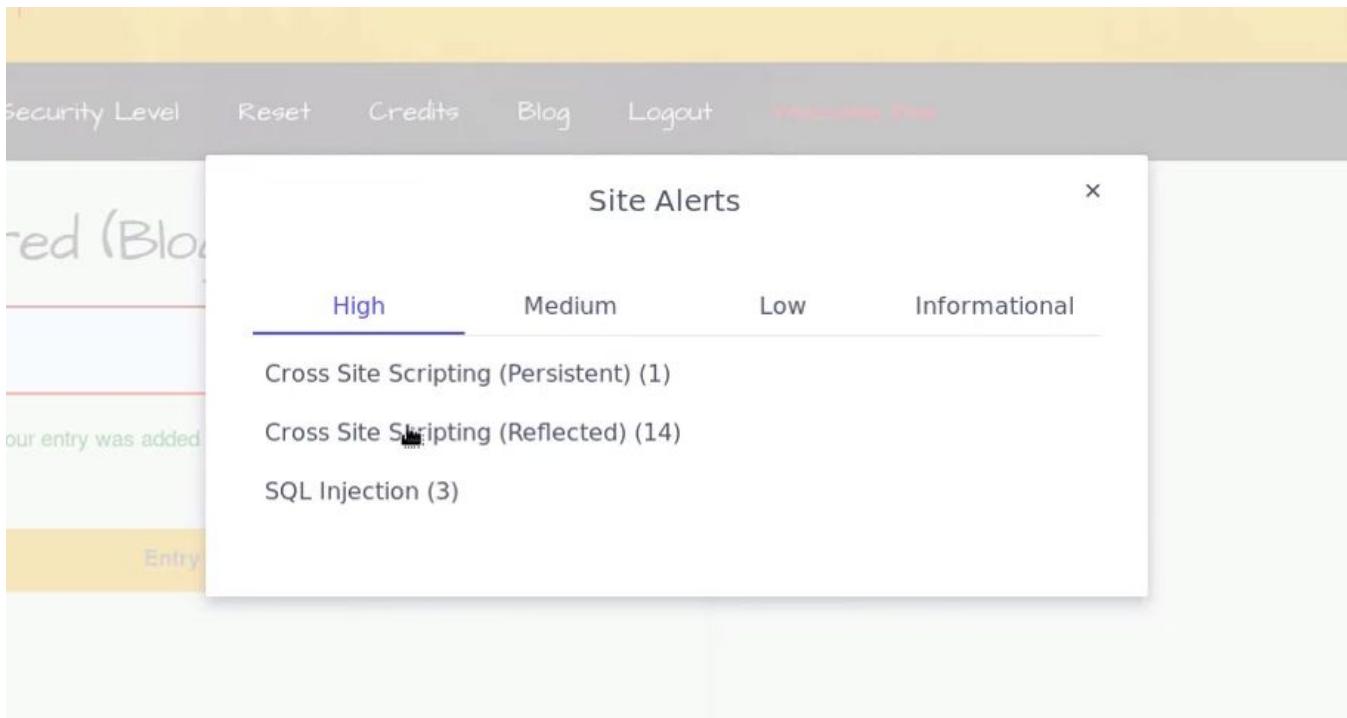
The screenshot shows a web browser window for 'bwAPP - HTML Injection' at the URL https://192.210.141.3/html_stored.php. The page title is 'bWAPP' and the sub-header is 'an extremely buggy web app!'. The main content area is titled '/ HTML Injection - Stored (Blog) /'. Below this is a text input field with a placeholder 'Your entry was added to our blog!'. Below the input field are buttons for 'Submit', 'Add: ', 'Show all: ', and 'Delete: '. A message 'Your entry was added to our blog!' is displayed below the buttons. To the right of the input field is a small 'OK' button inside a white box. At the bottom of the page is a table with columns '#', 'Owner', 'Date', and 'Entry'. One row is shown: #1, Owner bee, Date 2020-05-21 01:42:15, and Entry 'Your entry was added to our blog!'. The browser's address bar shows the URL, and the status bar indicates the page is loaded via HTTPS.

Step 34: Navigate to the right side and access the Alert section of the ZAP HUD.



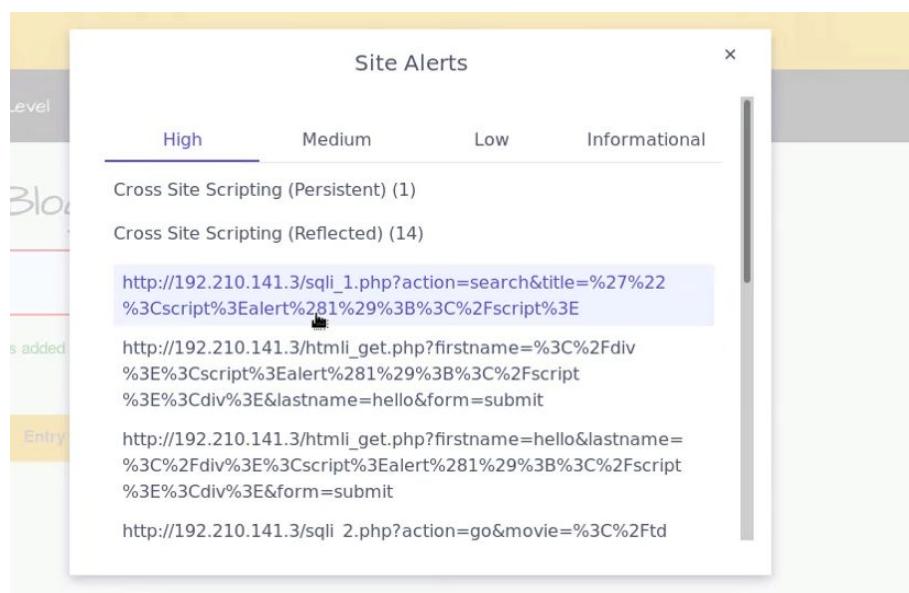
The screenshot shows the ZAP (Zed Attack Proxy) HUD. At the top, there is a yellow bar with the text 'Choose your bug:' and a dropdown menu set to 'bWAPP v2.2'. To the right of the dropdown is a 'Hack' button. Below this is a section titled 'Set your security level:' with a dropdown menu set to 'low', a 'Set' button, and a 'Current low' label. The main content area has a black header with the text 'Welcome Bee'. Below the header is a sidebar with social media icons for Twitter, LinkedIn, Facebook, and Email. To the right of the sidebar is a vertical toolbar with buttons for 'Sites', 'Start', 'Start', 'Start', 'Off', and a 'Site Alerts: High 3' button with three circular icons. The bottom right corner of the toolbar has a green '+' button.

ZAP HUD:

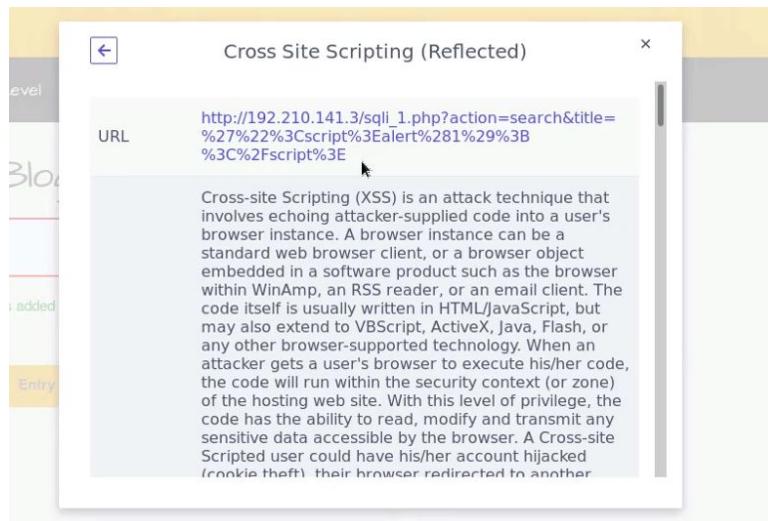


The screenshot shows the ZAP (Zed Attack Proxy) interface. At the top, there is a navigation bar with links for 'Security Level', 'Reset', 'Credits', 'Blog', 'Logout', and 'Welcome, Fred'. Below this, a 'Site Alerts' dialog box is open. The dialog has tabs for 'High', 'Medium', 'Low', and 'Informational', with 'High' being the active tab. Under the 'High' tab, there are three items listed: 'Cross Site Scripting (Persistent) (1)', 'Cross Site Scripting (Reflected) (14)', and 'SQL Injection (3)'. The 'Cross Site Scripting (Reflected)' item is highlighted with a blue background.

Step 35: Click on the "Cross Site Scripting (Reflected)" and click on the first URL.



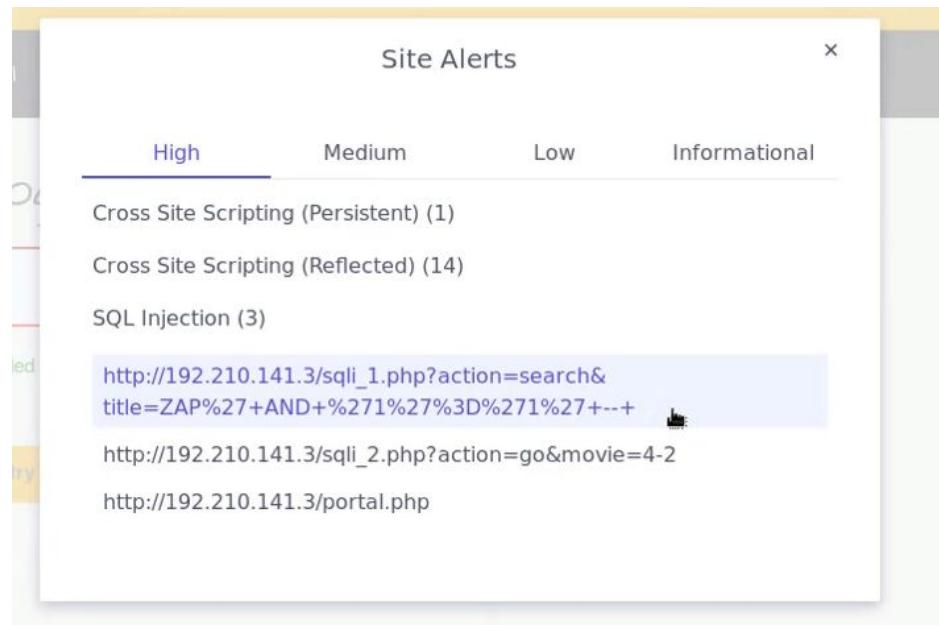
The screenshot shows the 'Site Alerts' dialog box from the previous step. The 'High' tab is selected, showing 'Cross Site Scripting (Persistent) (1)' and 'Cross Site Scripting (Reflected) (14)'. Below these, a list of URLs is displayed. The first URL, 'http://192.210.141.3/sqli_1.php?action=search&title=%27%22%3Cscript%3Ealert%281%29%3B%3C%2Fscript%3E', is highlighted with a blue background. The rest of the URLs are in a standard black font.



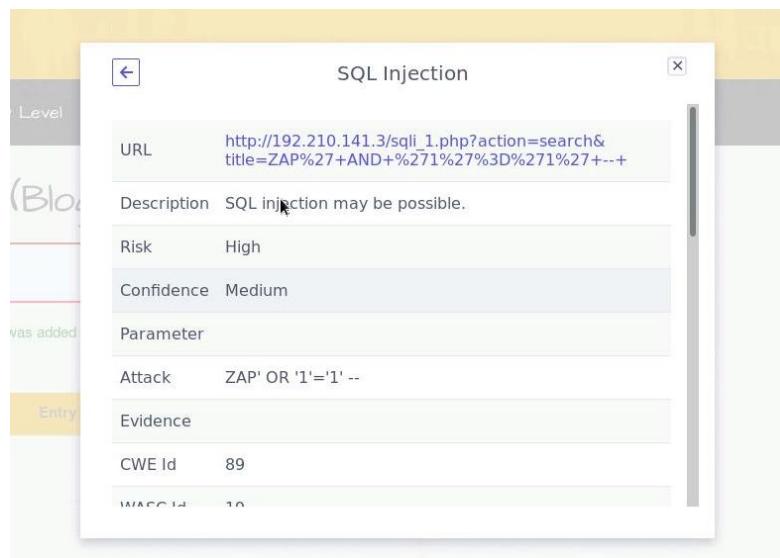
Step 36: Click on the URL on the dialog box.

The XSS payload will be triggered.

Step 37: Expand the SQL Injection Section from the Alerts section of ZAP HUD

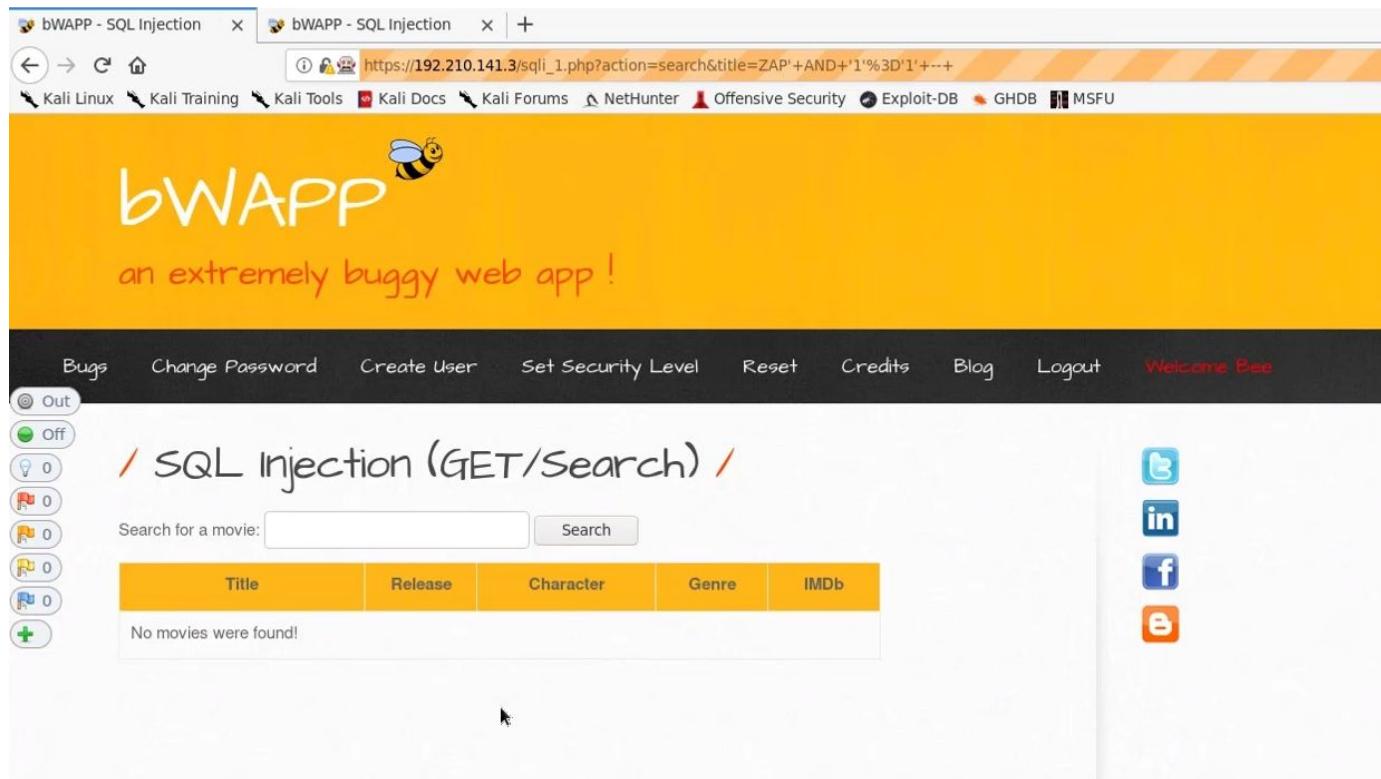


Step 38: Click on the First URL.



Step 39: Navigate to the URL

URL: http://192.210.141.3/sqli_1.php?action=search&title=ZAP'+AND+'1'%3D'1'+--+



The screenshot shows a web browser window for the bWAPP - SQL Injection application. The URL in the address bar is https://192.210.141.3/sqli_1.php?action=search&title=ZAP'+AND+'1'%3D'1'+--+. The page title is "bWAPP - SQL Injection". The main content area displays the bWAPP logo and the tagline "an extremely buggy web app!". Below this, there is a navigation bar with links: Bugs, Change Password, Create User, Set Security Level, Reset, Credits, Blog, Logout, and a "Welcome Bee" message. On the left, there are several status indicators: "Out" (radio button), "Off" (radio button), "0" (lightbulb icon), "0" (flag icon), "0" (flag icon), "0" (flag icon), and "0" (plus icon). The main search form has a placeholder "Search for a movie:" and a "Search" button. Below the search form is a table with columns: Title, Release, Character, Genre, and IMDb. A message "No movies were found!" is displayed in the table. To the right of the search form, there are social media sharing icons for Twitter, LinkedIn, Facebook, and Email.

No Records will appear.

Step 40: In the URL, change the AND condition into OR.

URL: http://192.210.141.3/sqli_1.php?action=search&title=ZAP'+OR+'1'%3D'1'+--+

The Payload to use is also mentioned on the Vulnerability information window (step 38).

• bWAPP - SQL Injection x | bWAPP - SQL Injection x | +

① 🐝 https://192.210.141.3/sql1_1.php?action=search&title=ZAP'+OR+'1'%3D'1'+--+

🔗 Kali Linux 🔗 Kali Training 🔗 Kali Tools 🔑 Kali Docs 🔗 Kali Forums 🔎 NetHunter 🔞 Offensive Security 🔒 Exploit-DB 🔑 GHDB 🔑 MSFU

bWAPP

an extremely buggy web app !

Bugs Change Password Create User Set Security Level Reset Credits Blog Logout Welcome Bee

/ SQL Injection (GET/Search) /

Search for a movie:

Title	Release	Character	Genre	IMDb
G.I. Joe: Retaliation	2013	Cobra Commander	action	Link
Iron Man	2008	Tony Stark	action	Link
Man of Steel	2013	Clark Kent	action	Link
Terminator Salvation	2009	John Connor	sci-fi	Link
The Amazing Spider-Man	2012	Peter Parker	action	Link
The Cabin in the Woods	2011	Some zombies	horror	Link

All the records present in the table will be dumped on the web page.

References:

1. OWASP Zed Attack Proxy (<https://www.zaproxy.org/>)
2. bWAPP (<http://www.itsecgames.com/>)