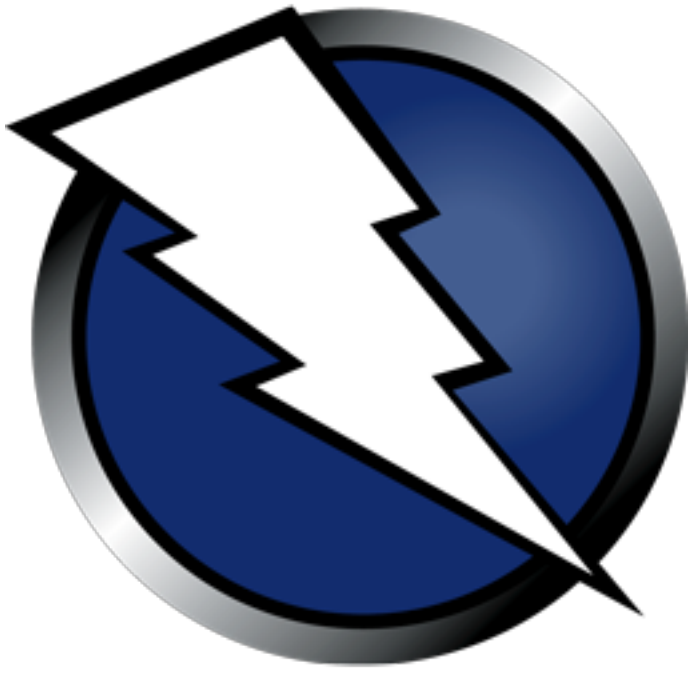


Introduction to OWASP ZAP



Introduction to OWASP ZAP

Learn how to use OWASP ZAP from the ground up. An alternative to BurpSuite.

[Task 1] Intro to ZAP



OWASP Zap is a security testing framework much like Burp Suite. It acts as a very robust enumeration tool. It's used to test web applications.

Why wouldn't I use Burp Suite? That's a GOOD question! Most people in the Info-sec community DO just use Burp Suite.

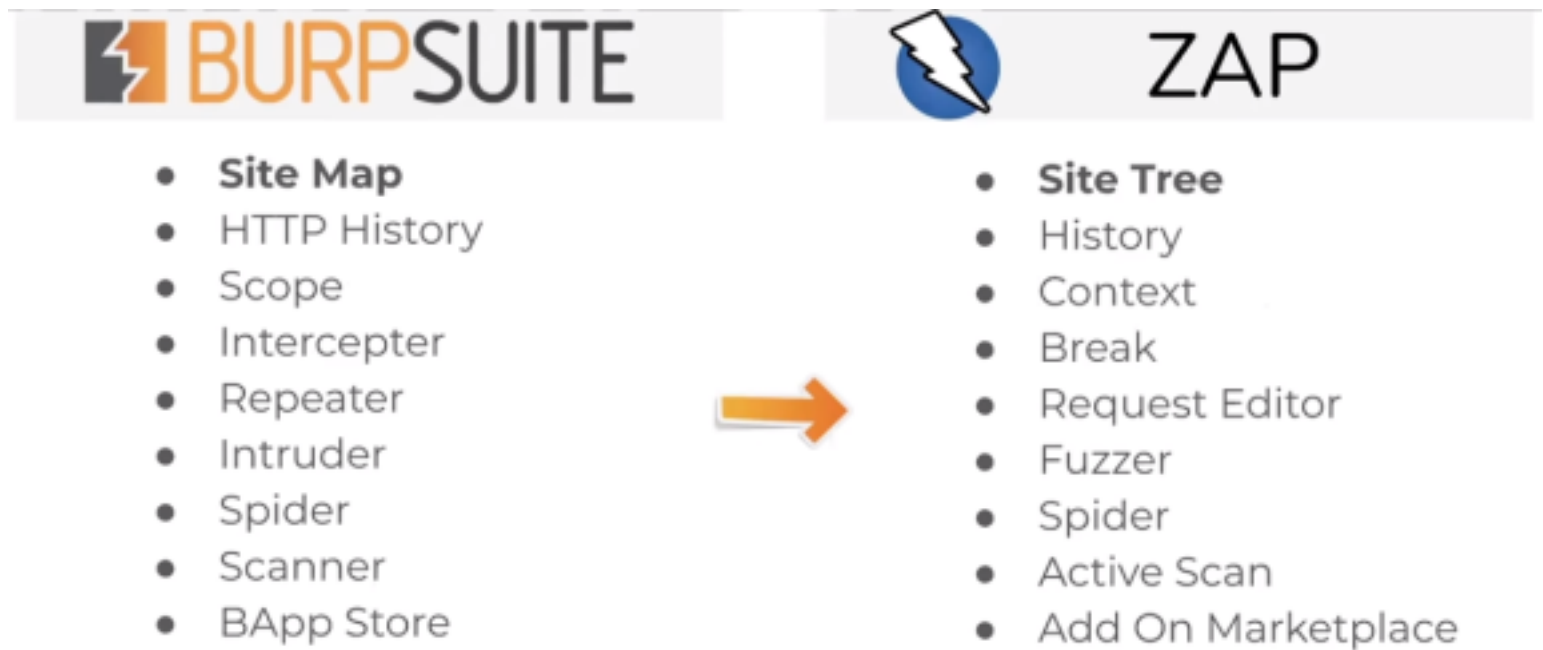
But OWASP ZAP has a few benefits and features that the Burp Suite does not and it's my preferred program of the two.

What are the benefits to OWASP ZAP? It's completely open source and free. There is no premium version, no features are locked behind a paywall, and there is no proprietary code.

There's a couple of feature benefits too with using OWASP ZAP over Burp Suite:

- **Automated Web Application Scan:** This will automatically passively and actively scan a web application, build a sitemap, and discover vulnerabilities. This is a paid feature in Burp.
- **Web Spidering:** You can passively build a website map with Spidering. This is a paid feature in Burp.
- **Unthrottled Intruder:** You can bruteforce login pages within OWASP as fast as your machine and the web-server can handle. This is a paid feature in Burp.
- **No need to forward individual requests through Burp:** When doing manual attacks, having to change windows to send a request through the browser, and then forward in burp, can be tedious. OWASP handles both and you can just browse the site and OWASP will intercept automatically. This is NOT a feature in Burp.

If you're already familiar with Burp the keywords translate over like so:



This guide will teach you how to do the following in ZAP:

- Automated Scan
- Directory Bruteforce
- Authenticated Scan
- Login Page Bruteforce
- Install ZAP Extensions

This room will be using OWASP Zap against the DVWA machine, feel free to deploy your own instance and follow along.

#1

What does ZAP stand for?

Zed Attack Proxy

#2

Connect to the TryHackMe network and deploy the machine. Once deployed, wait a few minutes and visit the web application: <http://10.10.153.246>

No answer needed

[Task 2] Disclaimer

ZAP is a great tool that's totally slept on, and I personally prefer it over Burp, but the documentation and support for the tool is microscopic compared to the titan that is Burp.

Burp has some extensions and features that ZAP does not have, as an example ZAP is unable to perform Login timing attacks. Burp can. If you wish to learn more about login timing attacks you can check out the TryHackMe room Hackernote.

ZAP can be used as your go-to tool to start Web Application testing but it should not be your *only* tool. ZAP is just one of many tools to put under your hacker utility belt.

#1

I've read the task.

No answer needed

[Task 3] Installation



OWASP ZAP has a handy installer for Windows, Mac OS, and Linux systems. Download and install it from the official website: <https://www.zaproxy.org/download/>

#1

Install ZAP on an operating system of your choice!

No answer needed

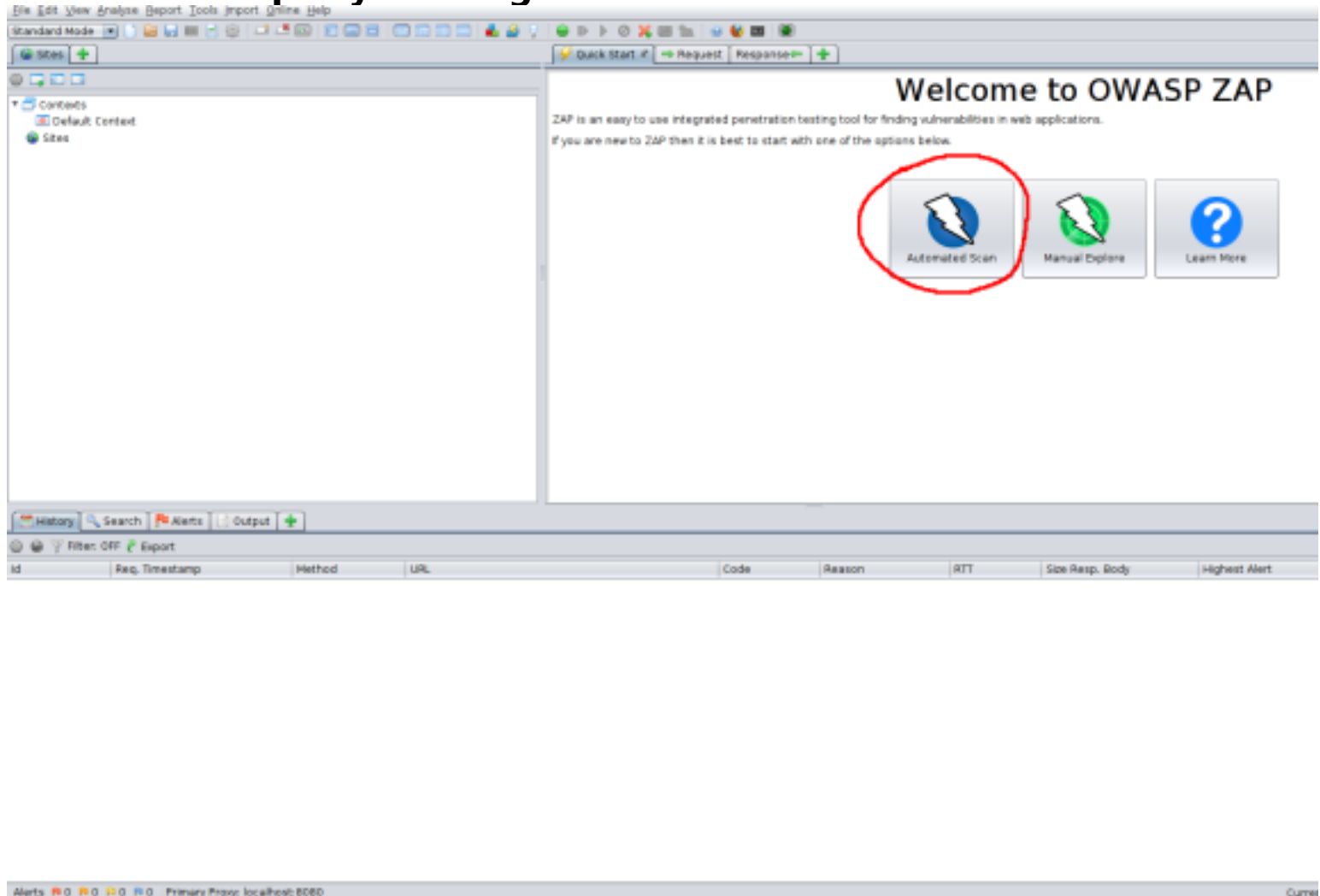
#2

Open OWASP ZAP, ready to follow along with this room.

No answer needed

[Task 4] How to perform an automated scan

Lets perform an automated scan. Click the big Automated Scan button and input your target.



The automated scan performs both passive and automated scans to build a sitemap and detect vulnerabilities. On the next page you may see the options to select either to use "traditional spider" or "Ajax spider".

A traditional spider scan is a passive scan that enumerates links and directories of the website. It builds a website index without brute-forcing. This is much quieter than a brute-force attack and can still net a login page or other juicy details, but is not as comprehensive as a bruteforce.

The Ajax Spider is an add-on that integrates in ZAP a crawler of AJAX rich sites called Crawljax. You can use it in conjunction with the traditional spider for better results. It uses your web browser and proxy.

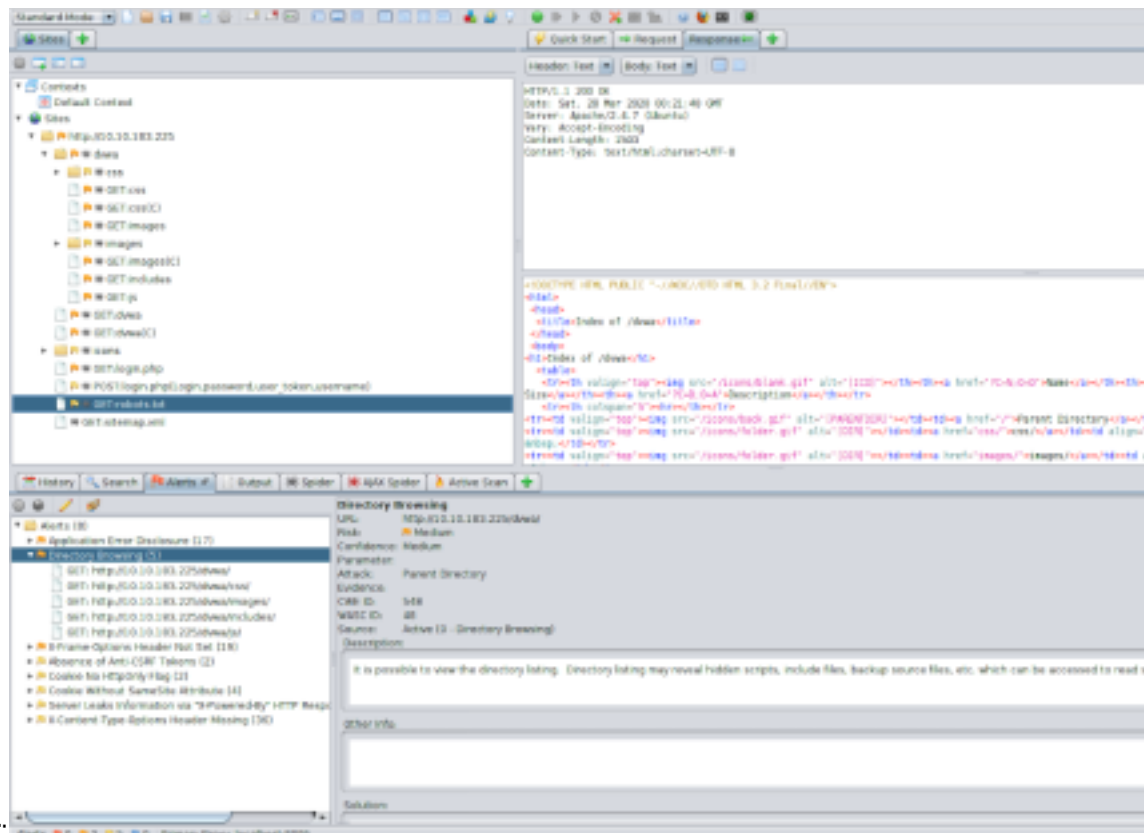
The easiest way to use the Ajax Spider is with HTMLUnit.

To install HTML Unit use the command

sudo apt install libjenkins-htmlunit-core-js-java

And then select HtmlUnity from the Ajax Spider Dropdown.

Both utilities can further be configured in the options menu (Ctrl+Alt+O)



Example Automated Scan Output:

With very minimal setup we were able to do an automated scan that gave us a sitemap and a handful of vulnerabilities.

#1

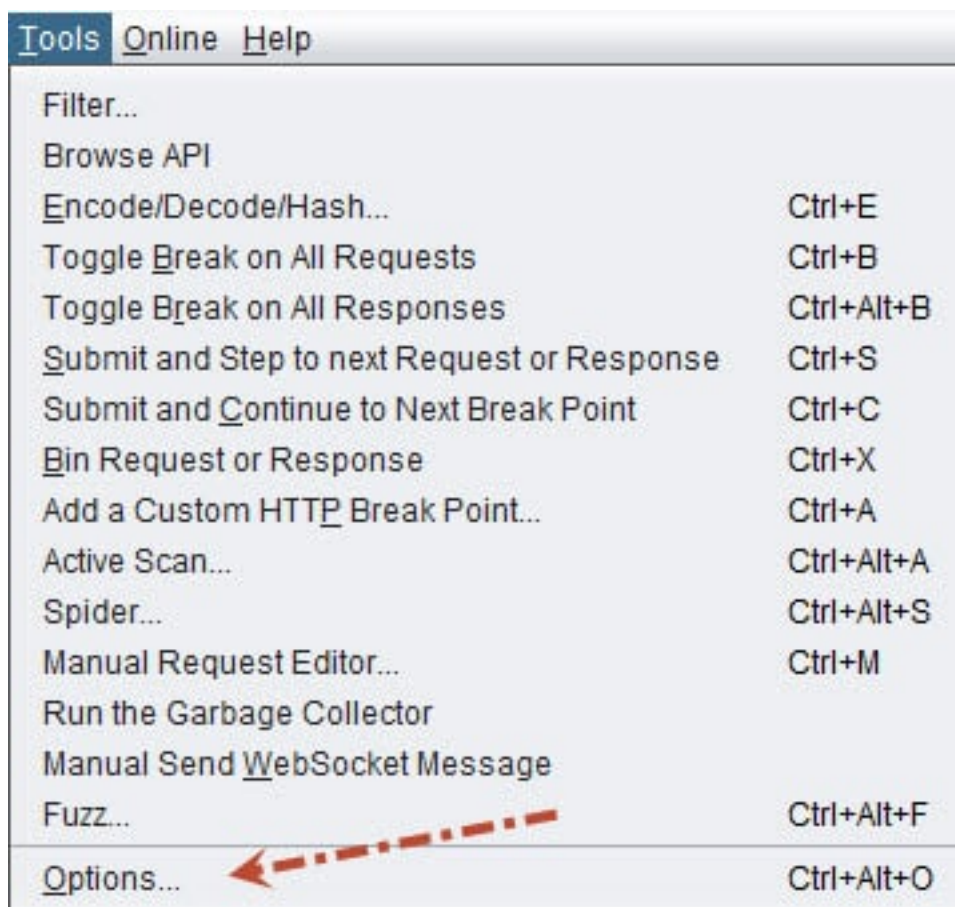
Set up Ajax Spider

No answer needed

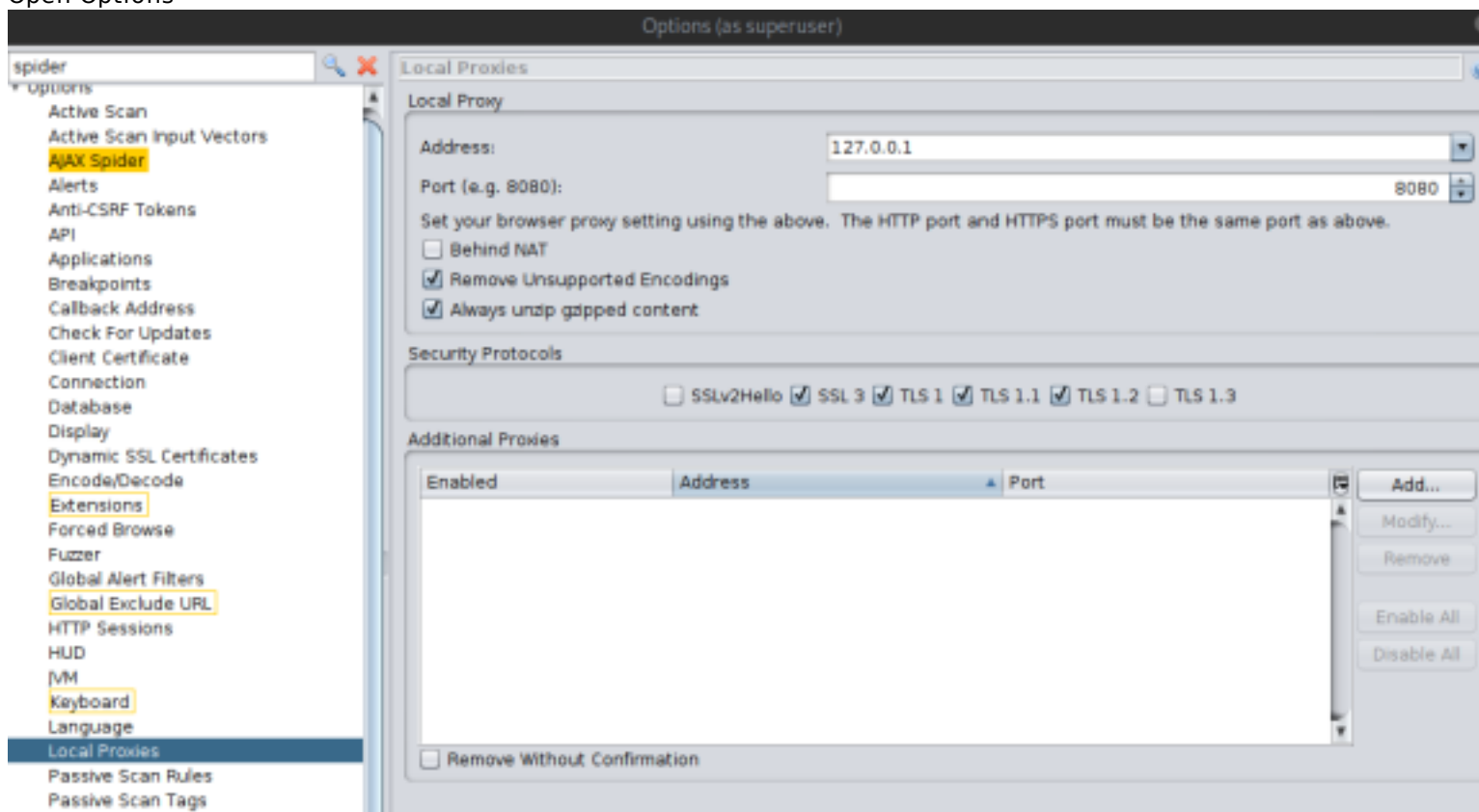
[Task 5] Manual Scanning

Lets perform a manual scan against the DVWA machine.
Like Burp, you should set-up your proxy between OWASP ZAP and your Browser. We'll be using Firefox.
=====

OWASP Proxy Setup:



Open Options

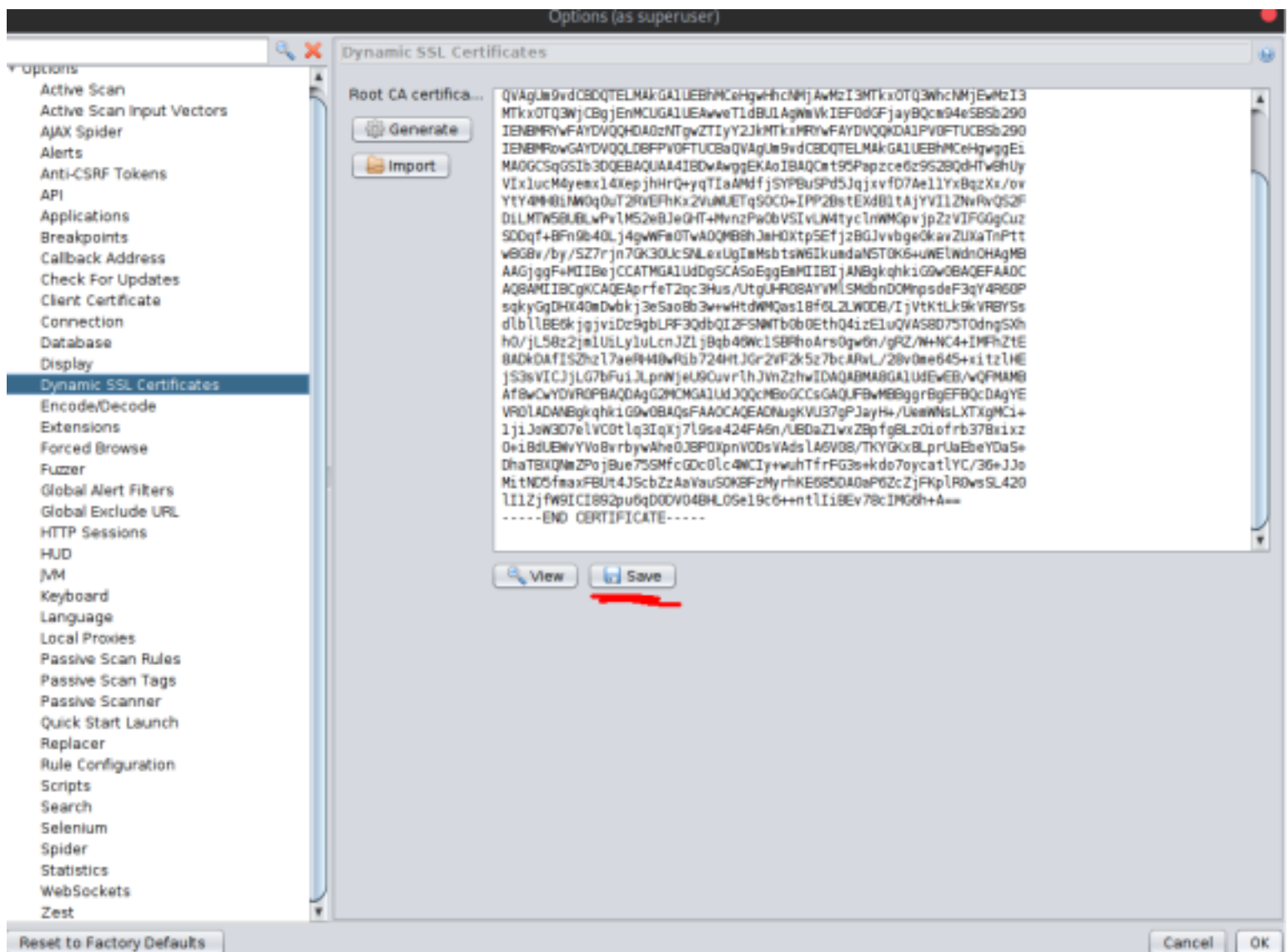


Change Local Proxy settings to the above.

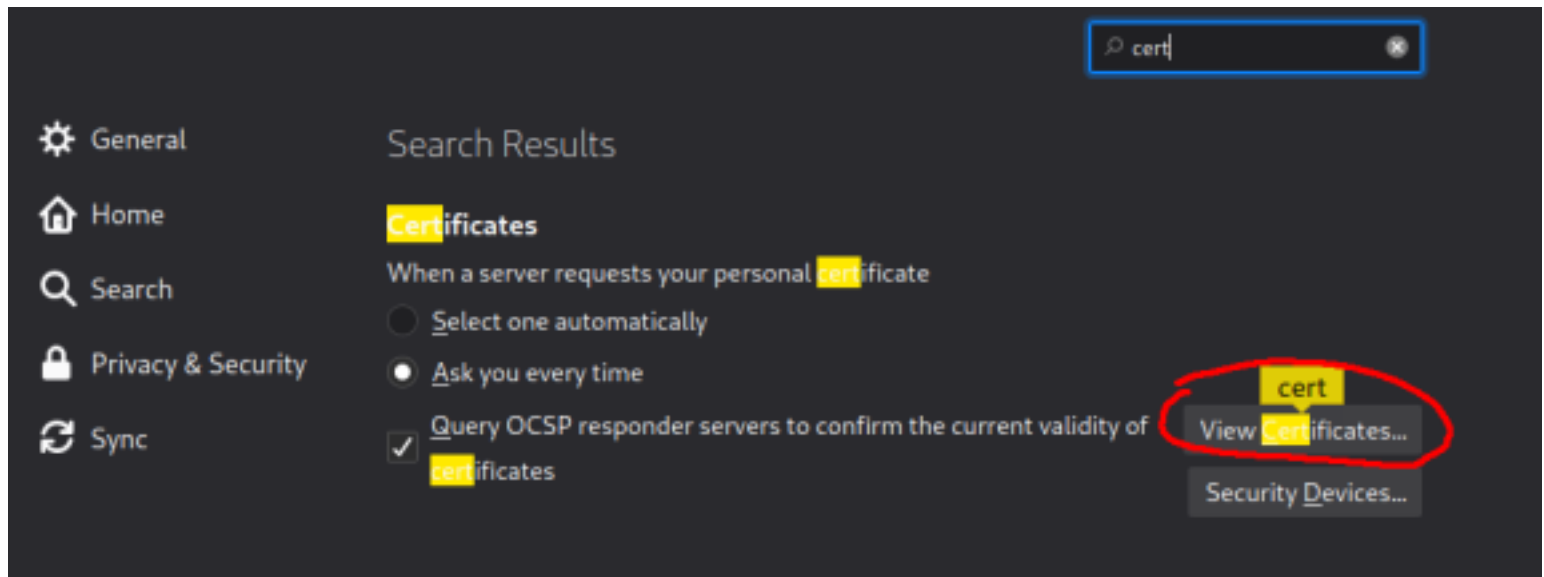
=====

Add ZAP Certificates:

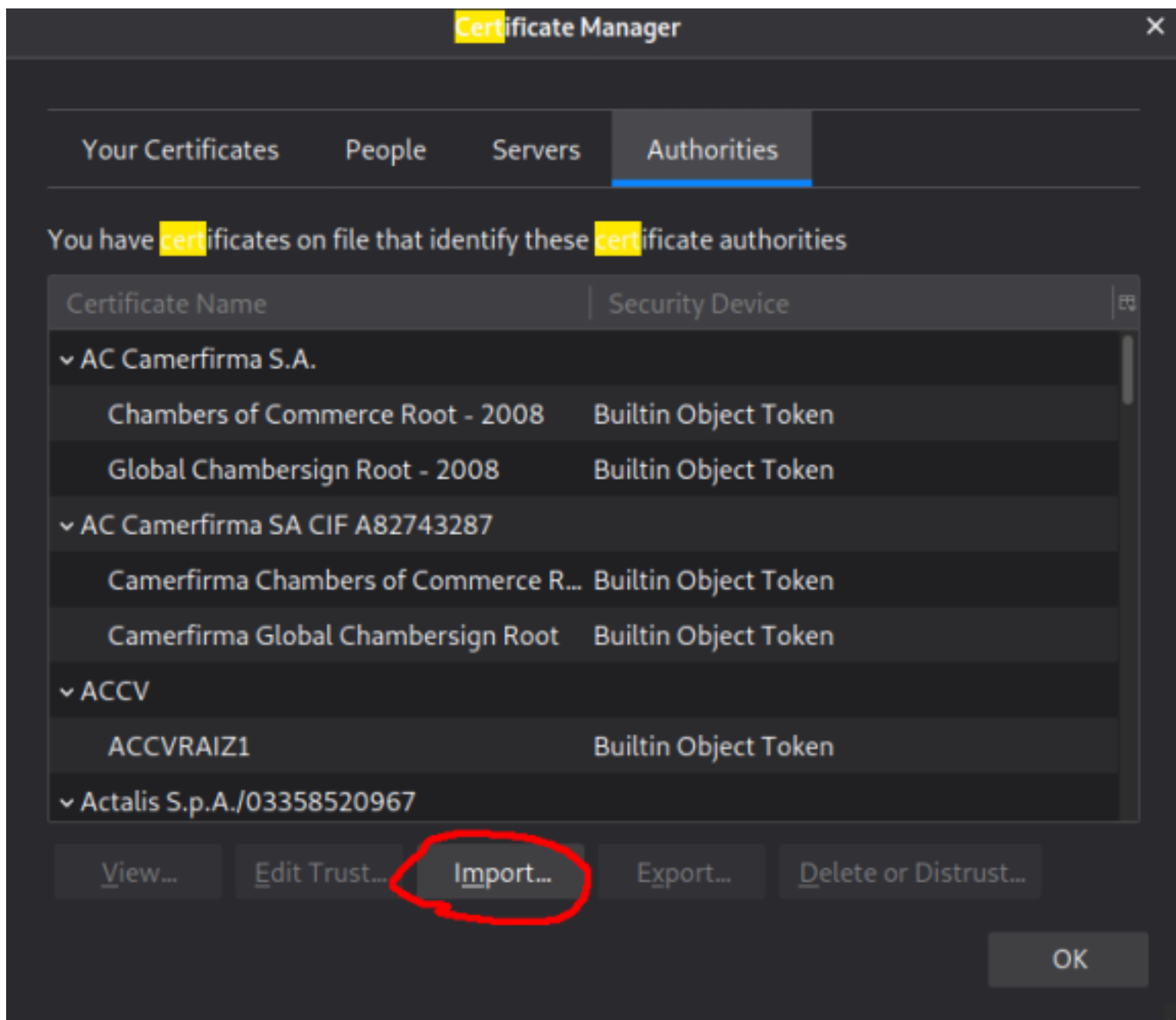
Without importing ZAP Certificates, ZAP is unable to handle simultaneous Web request forwarding and intercepting. Do not skip this step.



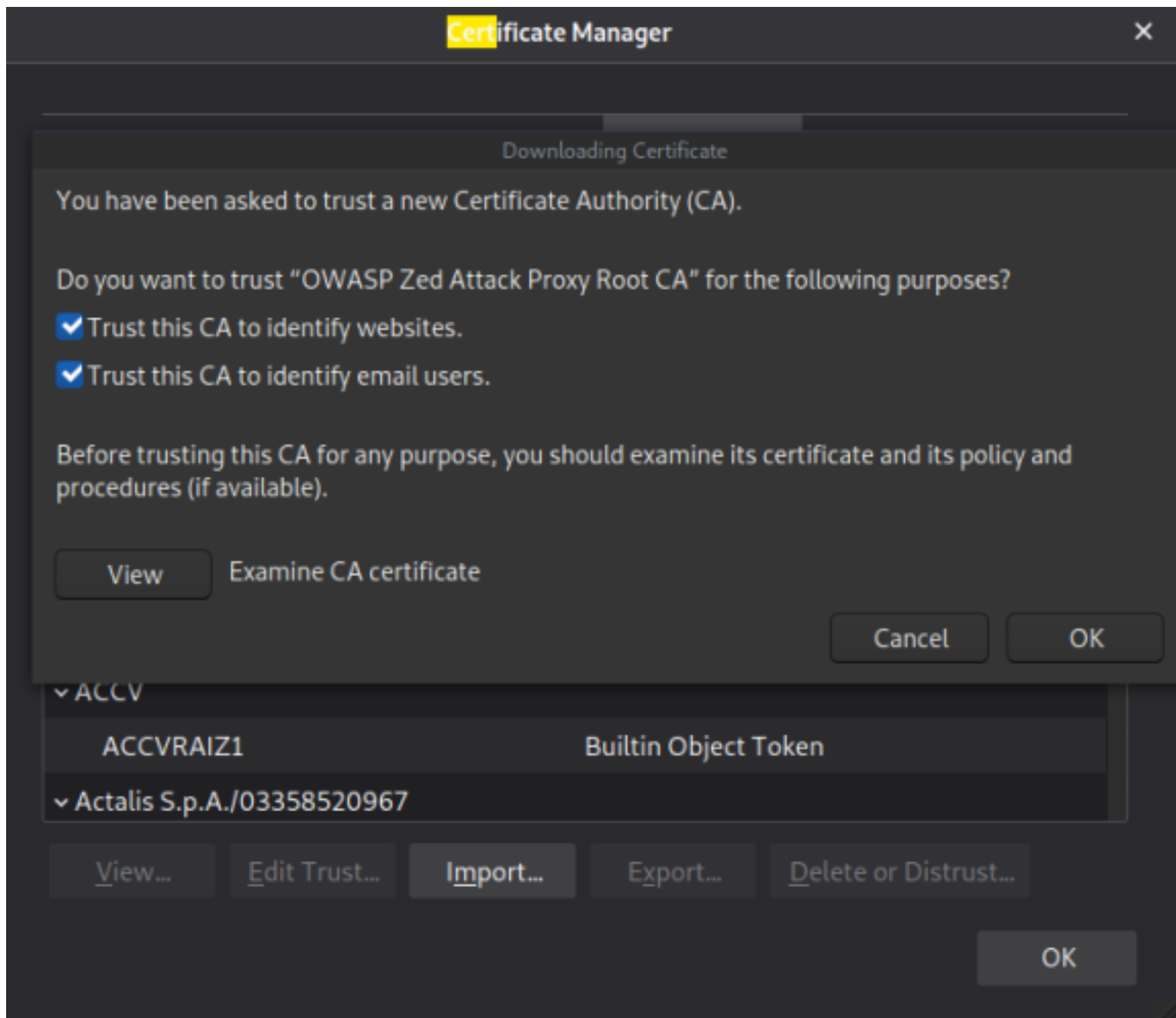
In the same options menu, navigate to Dynamic SSL Certificates and save the certificate somewhere you'll remember and not delete.



Then, open Firefox, navigate to your preferences, and search for certificates and click "View Certificates"



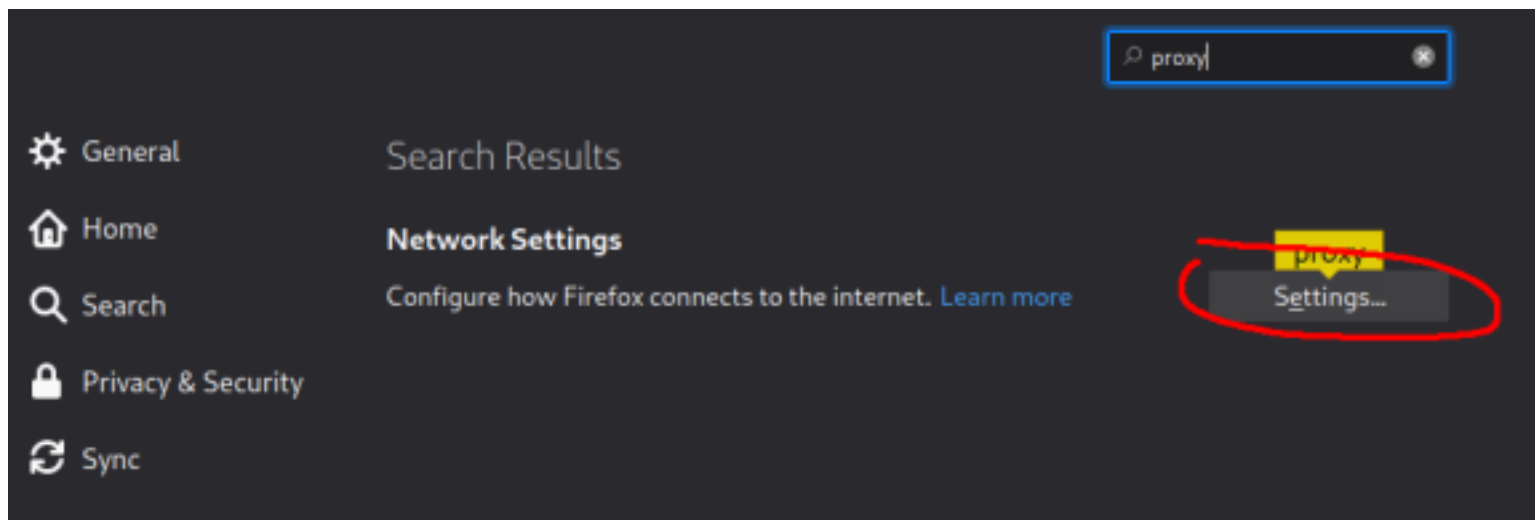
Then click "Import" and then navigate to the earlier downloaded certificate and open it.



Select both and then hit OK.

=====

Firefox Proxy Setup:



Go back to your Firefox preferences and search for “proxy”. Click Settings.

Connection Settings

Configure Proxy Access to the Internet

☐ No proxy

☐ Auto-detect proxy settings for this network

☐ Use system proxy settings

☒ Manual proxy configuration

HTTP Proxy127.0.0.1Port8080

☒ Also use this proxy for FTP and HTTPS

HTTPS Proxy127.0.0.1Port8080

FTP Proxy127.0.0.1Port8080

SOCKS Host127.0.0.1Port9050

☐ SOCKS v4☒ SOCKS v5

☐ Automatic proxy configuration URL

file:///etc/anonsurf/onion.pacReload

No proxy for

Example: .mozilla.org, .net.nz, 192.168.1.0/24

Connections to localhost, 127.0.0.1, and ::1 are never proxied.

☐ Do not prompt for authentication if password is saved

☐ Proxy DNS when using SOCKS v5

☐ Enable DNS over HTTPS

Use ProviderCloudflare (Default)

HelpCancelOK

Adjust your Manual Proxy Configuration to match and then click OK.

Now you're set-up! Time to get into the fun stuff :)

#1

What IP do we use for the proxy?


127.0.0.1

[Task 6] Scanning an Authenticated Web Application

Without your Zap application being authenticated, it can't scan pages that are only accessible when you've logged in. Lets set up the OWASP ZAP application to scan these pages, using your logged in session.

Lets go to the DVWA machine (<http://10.10.153.246>), and login using the following credentials:

Username: admin**Password:** password



Home

Instructions

Setup / Reset DB

Brute Force

Command Injection

CSRF

File Inclusion

File Upload

Insecure CAPTCHA

SQL Injection

SQL Injection (Blind)

Weak Session IDs

XSS (DOM)

XSS (Reflected)

XSS (Stored)

CSP Bypass

JavaScript

DVWA Security

PHP Info

About

Logout

Welcome to Damn Vulnerable Web Application!

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

The aim of DVWA is to **practice some of the most common web vulnerabilities**, with **various levels of difficulty**, with a simple straightforward interface.

General Instructions

It is up to the user how they approach DVWA. Either by working through every module at a fixed level, or selecting any module and working up to reach the highest level they can before moving onto the next one. There is not a fixed object to complete a module; however users should feel that they have successfully exploited the system as best as they possible could by using that particular vulnerability.

Please note, there are **both documented and undocumented vulnerability** with this software. This is intentional. You are encouraged to try and discover as many issues as possible.

DVWA also includes a Web Application Firewall (WAF), PHPIDS, which can be enabled at any stage to further increase the difficulty. This will demonstrate how adding another layer of security may block certain malicious actions. Note, there are also various public methods at bypassing these protections (so this can be seen as an extension for more advanced users)!

There is a help button at the bottom of each page, which allows you to view hints & tips for that vulnerability. There are also additional links for further background reading, which relates to that security issue.

WARNING!

Damn Vulnerable Web Application is damn vulnerable! **Do not upload it to your hosting provider's public html folder or any Internet facing servers**, as they will be compromised. It is recommend using a virtual machine (such as [VirtualBox](#) or [VMware](#)), which is set to NAT networking mode. Inside a guest machine, you can downloading and install [XAMPP](#) for the web server and database.

Disclaimer

We do not take responsibility for the way in which any one uses this application (DVWA). We have made the purposes of the application clear and it should not be used maliciously. We have given warnings and taken measures to prevent users from installing DVWA on to live web servers. If your web server is compromised via an installation of DVWA it is not our responsibility it is the responsibility of the person/s who uploaded and installed it.

After

[Home](#)[Instructions](#)[Setup / Reset DB](#)[Brute Force](#)[Command Injection](#)[CSRF](#)[File Inclusion](#)[File Upload](#)[Insecure CAPTCHA](#)[SQL Injection](#)[SQL Injection \(Blind\)](#)[Weak Session IDs](#)[XSS \(DOM\)](#)[XSS \(Reflected\)](#)[XSS \(Stored\)](#)[CSP Bypass](#)[JavaScript](#)[DVWA Security](#)[PHP Info](#)[About](#)[Logout](#)

DVWA Security

Security Level

Security level is currently: **impossible**.

You can set the security level to low, medium, high level of DVWA:

1. Low - This security level is completely vulnerable as an example of how web application vulnerabilities can be used as a platform to teach or learn basic exploitation techniques.
2. Medium - This setting is mainly to give an attacker a developer has tried but failed to secure an application using exploitation techniques.
3. High - This option is an extension to the medium level practices to attempt to secure the code. This level is similar in various Capture The Flag challenges.
4. Impossible - This level should be secure and not allow access to the source code. Prior to DVWA v1.9, this level was known as 'Very High'.



PHPIDS

[PHPIDS](#) v0.6 (PHP-Intrusion Detection System) is a web application firewall.

PHPIDS works by filtering any user supplied input. DVWA to serve as a live example of how Web Applications can be secured in some cases how WAFs can be circumvented.

You can enable PHPIDS across this site for the default security level.

PHPIDS is currently: **disabled**. [\[Enable PHPIDS\]](#)

[\[Simulate attack\]](#) - [\[View IDS log\]](#)

For the purpose of this exercise, once you've logged in, navigate to the DVWA Security tab and set the Security level to Low and then hit submit.

We're going to pass our authentication token into ZAP so that we can use the tool to scan authenticated webpages.

The screenshot shows the ZAP interface. The top toolbar includes buttons for Inspector, Console, Debugger, Network, and Style Editor. The left sidebar shows a tree view of the application structure. The main pane displays the Cookies tab, showing a list of cookies for the URL https://10.10.183.225. The cookie 'PHPSESSID' has the value 'd9ghtkvcj1upc0rdsb20tl5fu6'. The 'security' column is set to 'impossible'.

Below the Cookies tab, the HTTP Sessions tab is visible. It shows a list of sessions with columns for Name, Session Token, Values, and Messages Matched. Session 4 is highlighted, and a context menu is open over it, showing options like 'Set as Active', 'Remove Session', 'Copy Session Token Value to Clipboard', and 'Find Related Messages'.

Enter inspect element and take note of your PHPSESSION cookie.

In ZAP open the HTTP Sessions tab with the new tab button, and set the authenticated session as active. Now re-scan the application. You'll see it's able to pick up a *lot* more. This is because its able to see all of the sections of DVWA that was previously behind the login page.

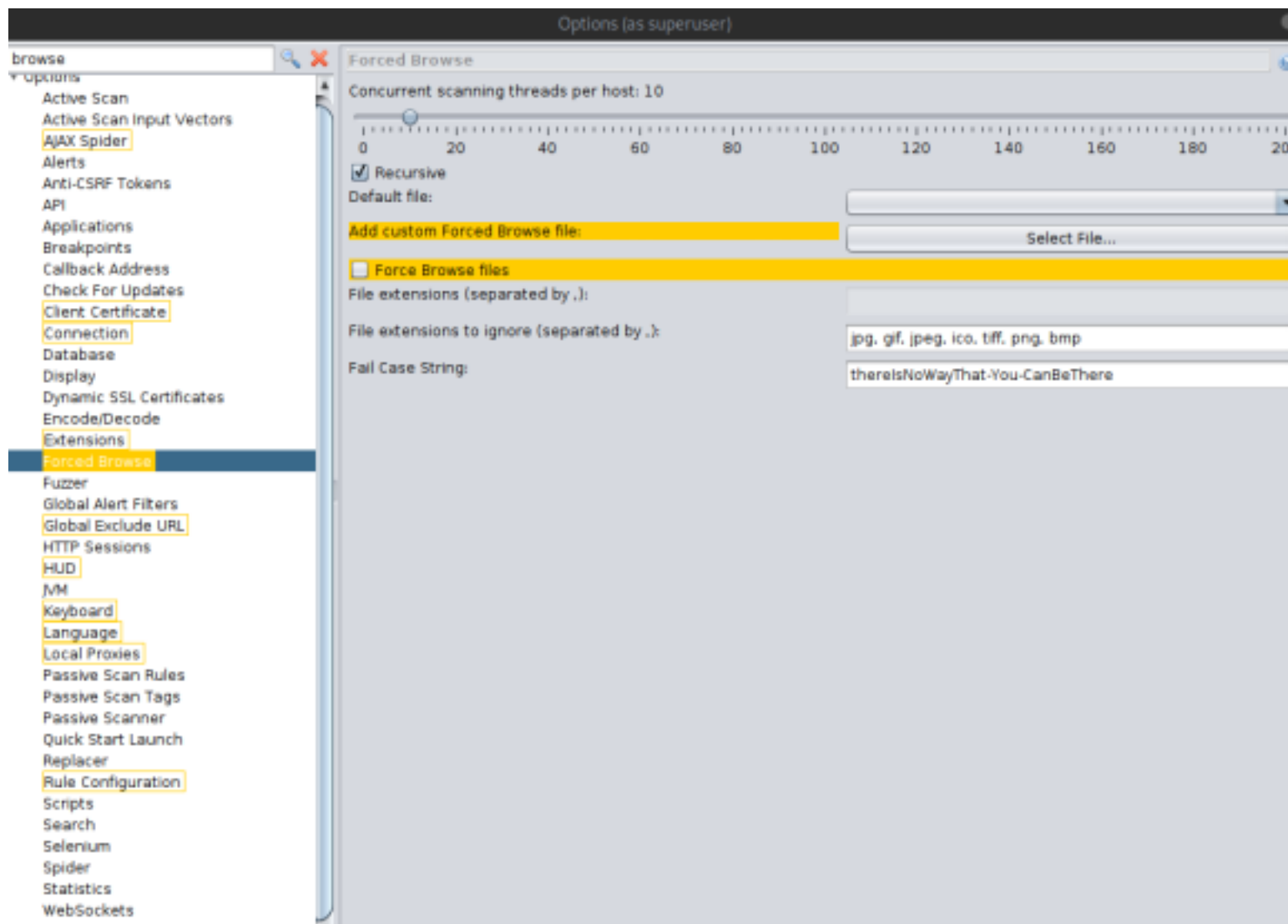
#1

Try scanning the DVWA web application as an authenticated user.

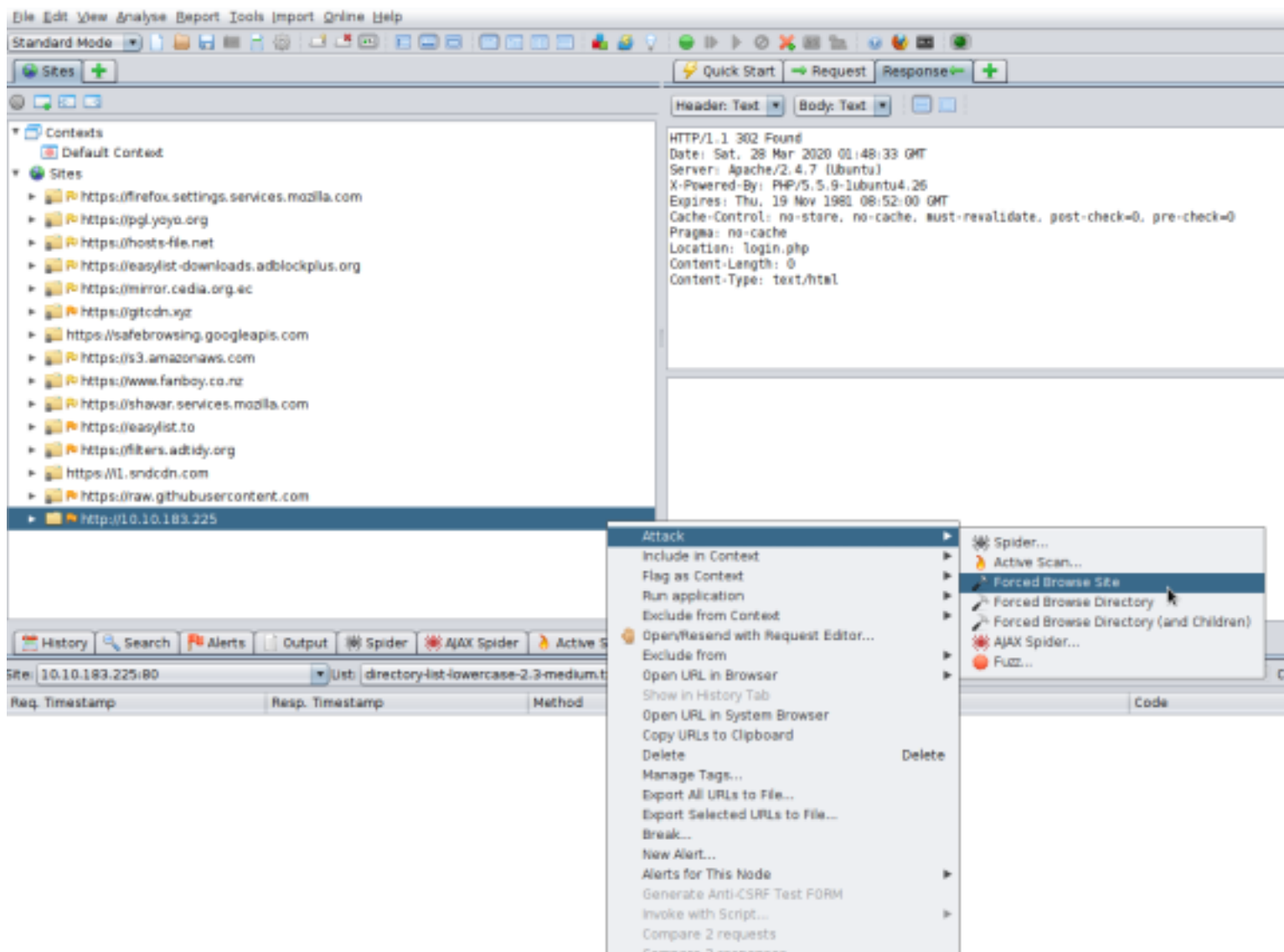
No answer needed

[Task 7] Brute-force Directories

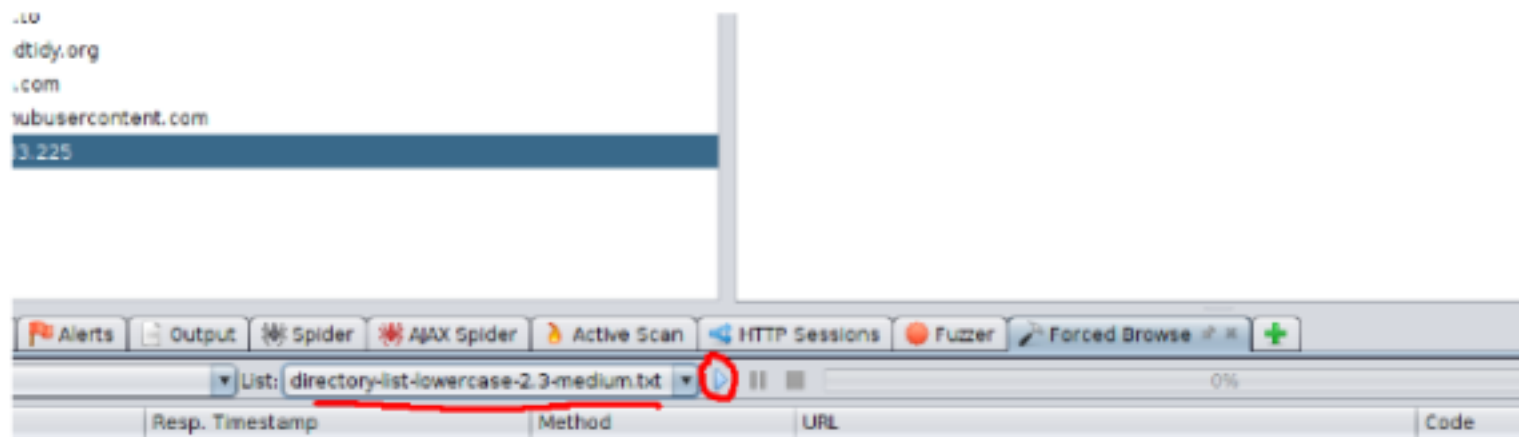
If the passive scans are not enough, you can use a wordlist attack and directory bruteforce through ZAP just as you would with gobuster. This would pick up pages that are not indexed.



First. Go into your ZAP Options (at the bottom navigation panel, with the screen plus button), navigate to Forced Browse, and add the Custom Wordlist. You can also add more threads and turn off recursive brute-forcing.



Then, right click the site->attack->forced browse site



Select your imported wordlist from the list menu, and then hit the play button! We recommend using this wordlist for this exercise.

ZAP will now bruteforce the entire website with your wordlist.

#1

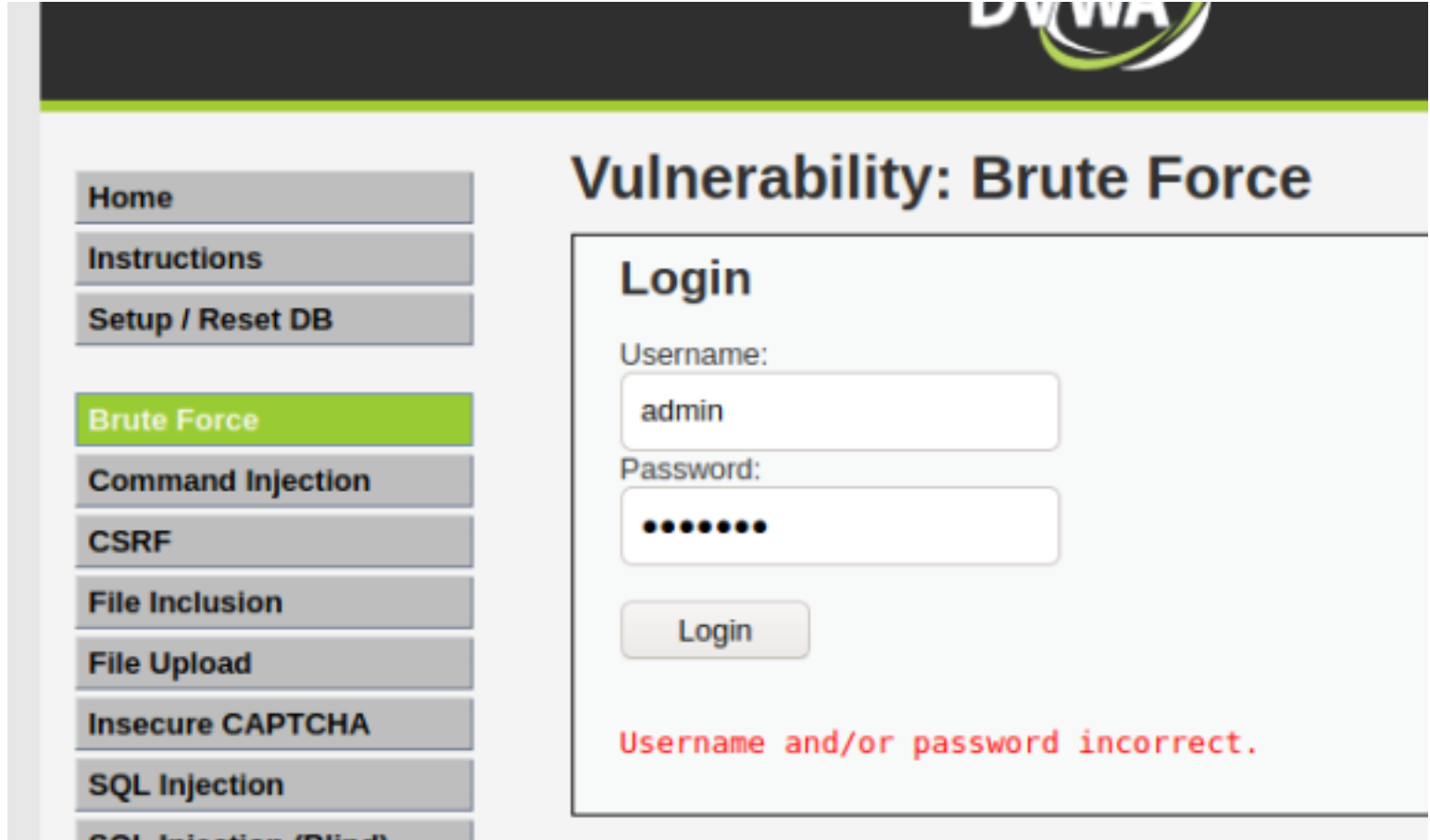
Try brute-forcing the DVWA web application.

No answer needed

[Task 8] Brute-force Web Login

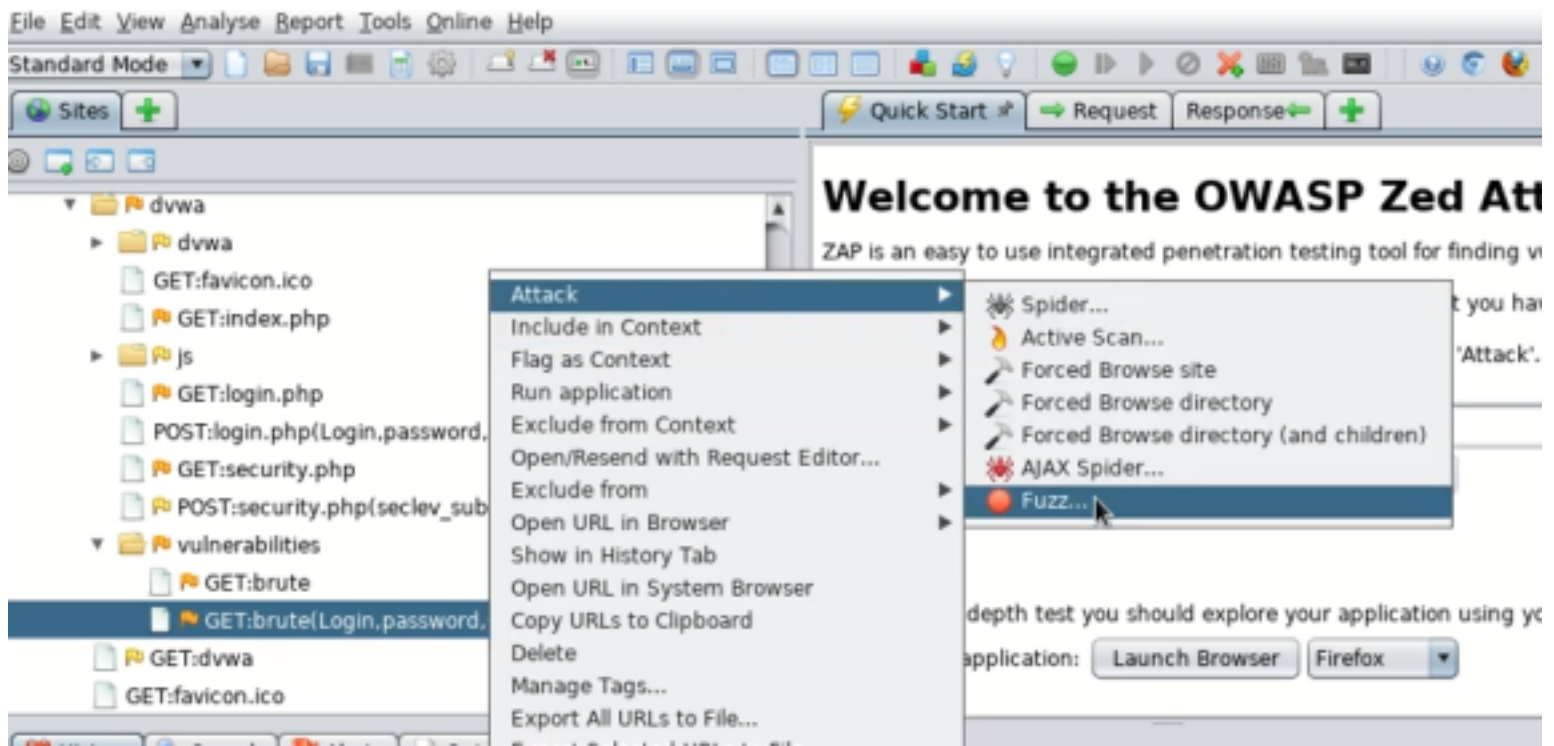
Lets brute-force a form to get credentials. Although we already know the credentials, lets see if we can use Zap to obtain credentials through a Brute-Force attack.

If you wanted to do this with BurpSuite, you'd need to intercept the request, and then pass it to Hydra. However, this process is much easier with ZAP!

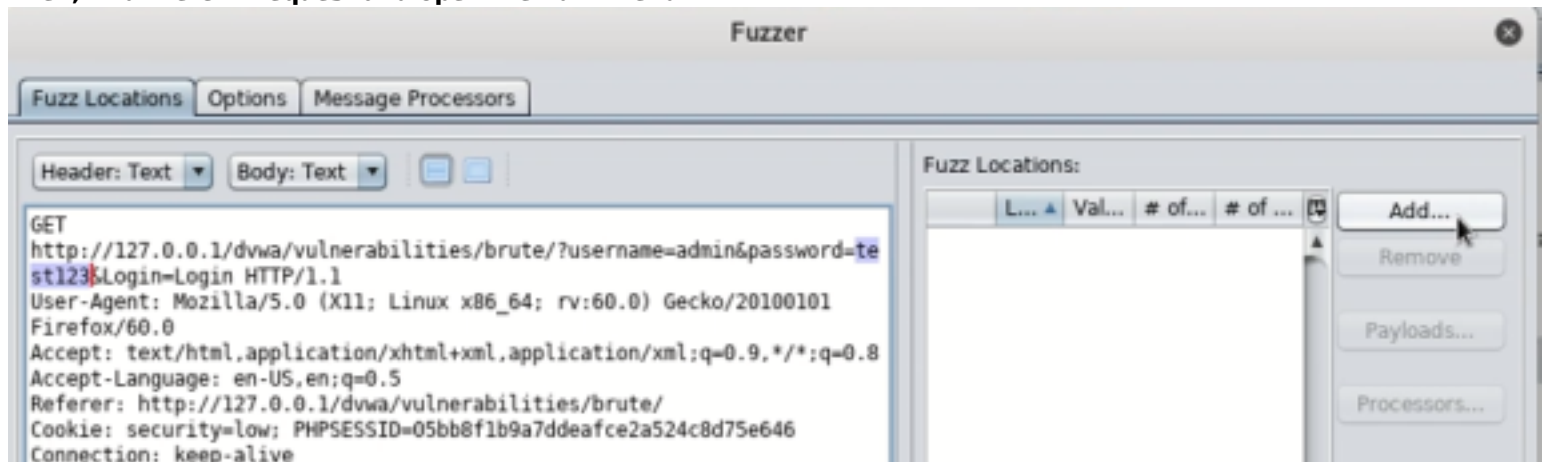


The screenshot shows the DVWA (Damn Vulnerable Web Application) interface. On the left is a sidebar with navigation links: Home, Instructions, Setup / Reset DB, Brute Force (highlighted in green), Command Injection, CSRF, File Inclusion, File Upload, Insecure CAPTCHA, SQL Injection, and SQL Injection (Blind). The main content area is titled "Vulnerability: Brute Force" and contains a "Login" form. The form has two input fields: "Username:" with the value "admin" and "Password:" with masked characters (dots). Below the fields is a "Login" button. A red error message at the bottom of the form reads "Username and/or password incorrect." The DVWA logo is visible in the top right corner of the page header.

Navigate to the Brute Force page on DVWA and attempt login as "admin" with the password "test123"



Then, find the GET request and open the Fuzz menu.



Then highlight the password you attempted and add a wordlist. This selects the area of the request you wish to replace with other data.

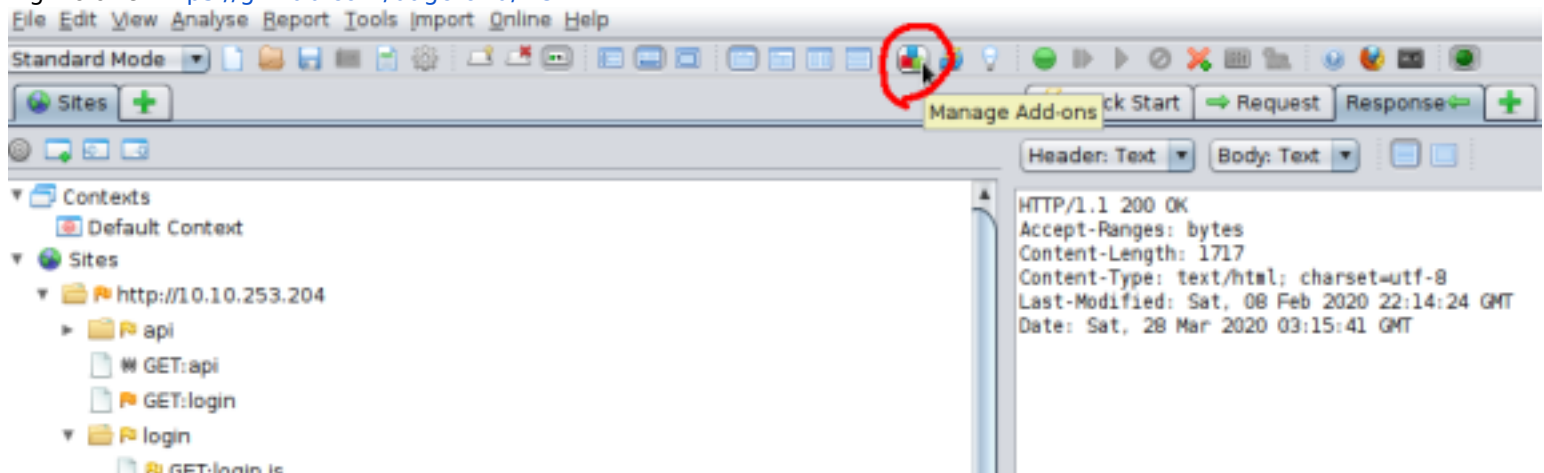
<https://github.com/bugcrowd/HUNT>

Let's install the bugcrowd HUNT extensions for OWASP ZAP. This will passively scan for known vulnerabilities in web applications.



First navigate in your terminal somewhere you'd like to store the scripts

``git clone https://github.com/bugcrowd/HUNT``



Then in ZAP click the "Manage Add-Ons" icon

Manage Add-ons (as superuser)

InstalledMarketplace

Add-ons

Filter:

Status	Name	Description	Update	
Beta	Image Location and Priva...	Image Location and Privacy Passive Scanner	1.0.0	<input type="checkbox"/>
Beta	Passive scanner rules (b...	The beta quality Passive Scanner rules	21.0.0	<input type="checkbox"/>
Beta	Plug-n-Hack Configuration	Supports the Mozilla Plug-n-Hack standard: https:...	11.0.0	<input type="checkbox"/>
Beta	Port Scanner	Allows to port scan a target server	8.0.0	<input type="checkbox"/>
Beta	Python Scripting	Allows Python to be used for ZAP scripting - temp...	10.0.0	<input checked="" type="checkbox"/>
Beta	Report alert generator	Allows you to generate reports for alerts you spe...	14.0.0	<input type="checkbox"/>
Beta	Ruby scripting	Allows Ruby to be used for ZAP scripting - templa...	6.0.0	<input type="checkbox"/>
Beta	SVN Digger files	SVN Digger files which can be used with ZAP forc...	3.0.0	<input type="checkbox"/>
Beta	Token Generation and An...	Allows you to generate and analyze pseudo rand...	13.0.0	<input type="checkbox"/>
Beta	TreeTools	Tools to add functionality to the tree view.	7.0.0	<input type="checkbox"/>
Alpha	Access Control Testing	Adds a set of tools for testing access control in ...	5.0.0	<input type="checkbox"/>
Alpha	Active scanner rules (alp...	The alpha quality Active Scanner rules	27.0.0	<input type="checkbox"/>
Alpha	All In One Notes	A simple extension to view all notes in one pane.	1.0.0	<input type="checkbox"/>
Alpha	AMF	Adds support for AMF messages	2.0.0	<input type="checkbox"/>
Alpha	Attack Surface Detector	The Attack Surface Detector analyzes web applic...	1.1.4	<input type="checkbox"/>
Alpha	Authentication Statistics	Records logged in/out statistics for all contexts i...	1.0.0	<input type="checkbox"/>
Alpha	Browser View	Adds an option to render HTML responses like a ...	5.0.0	<input type="checkbox"/>
Alpha	Bug Tracker	Bug Tracker extension.	2.0.0	<input type="checkbox"/>
Alpha	Call Graph	Allows the user to view a call graph of the select...	4.0.0	<input type="checkbox"/>
Alpha	Code Dx Extension	Includes request and response data in XML repor...	8.0.0	<input type="checkbox"/>
Alpha	Community Scripts	Useful ZAP scripts written by the ZAP community.	9.0.0	<input checked="" type="checkbox"/>
Alpha	Custom Payloads	Ability to add, edit or remove payloads that are u...	0.9.0	<input type="checkbox"/>
Alpha	CustomReport	New HTML report module allows users to customi...	5.0.0	<input type="checkbox"/>

Name Python Scripting

Status Beta

Version 10.0.0

Description Allows Python to be used for ZAP scripting - templates included

Changes

Correctly set path module defined in the options and address UI hang (Issue 4651).
 Minor tweak in extender template.
 Add default template for Script Input Vector.
 Add help page for the options.

Id jython

Author ZAP Dev Team

Not Before Version 2.7.0

Install Selected

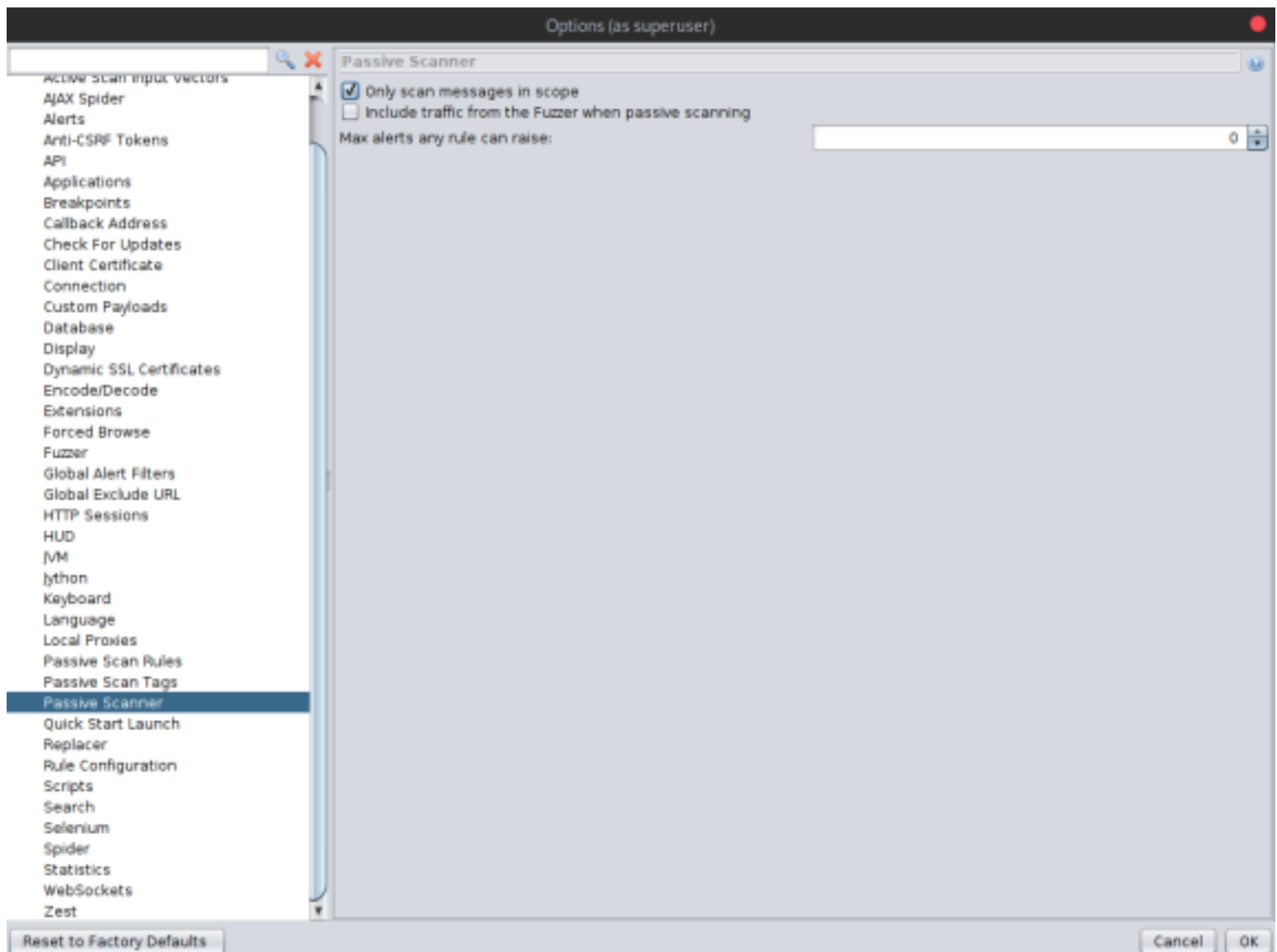
More Info

Close

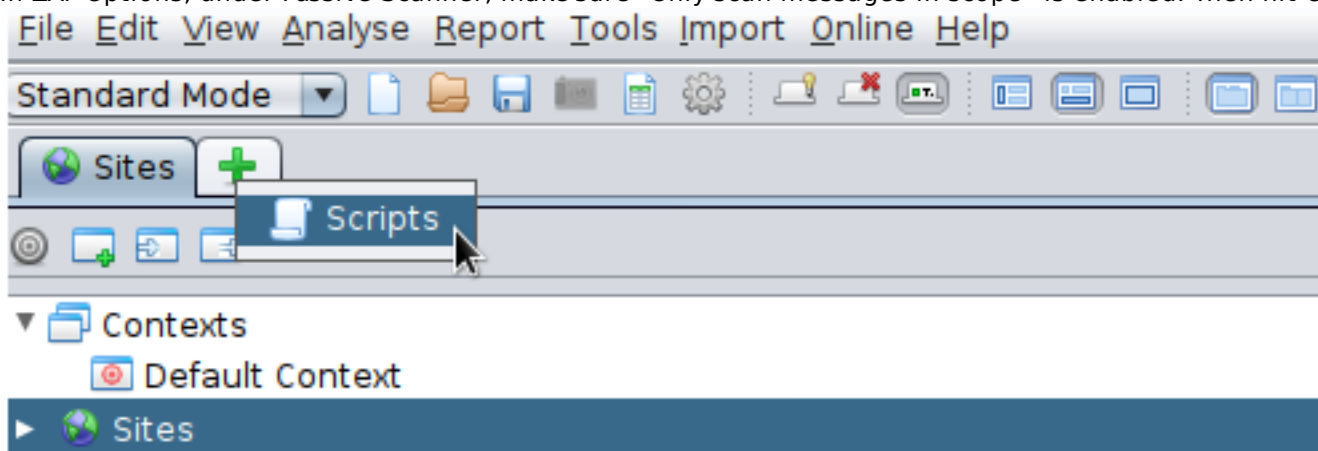
All updates downloaded, see Output tab for details.

From the Marketplace install “Python Scripting” and “Community Scripts”

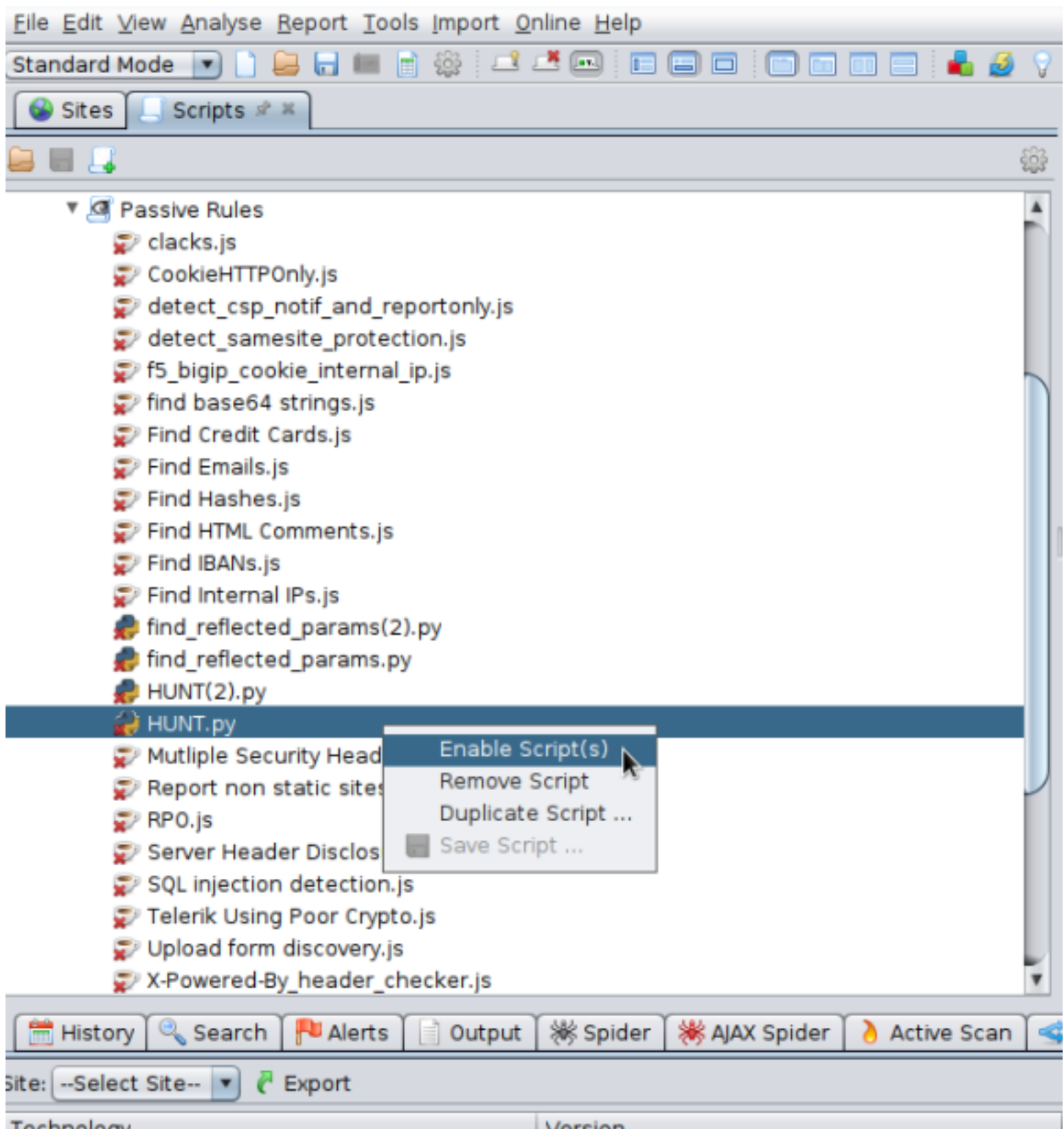
21/24



In ZAP Options, under Passive Scanner, make sure “Only scan messages in scope” is enabled. Then hit OK.



In ZAP open the Scripts tab.



And under Passive Rules, find and enable the HUNT.py script
Now when you browse sites and HUNT will passively scan for SQLi, LFI, RFI, SSRF, and others. Exciting!

#1

Set up HUNT on your Zap application to automatically perform passive scans on sites you visit!

No answer needed

[Task 10] Further Reading

Wow! You reached the end! Good job! Try your new ZAP skills on some Web Application CTFs.

TryHackMe has quite the variety. My personal favorite is HackPark.

Desktop eManuel: <https://www.zaproxy.org/docs/desktop/ui/>

OWASP ZAP Forums: <https://groups.google.com/forum/#!forum/zaproxy-users>

Yeah that's pretty much all there is. I wasn't kidding when I said "microscopic" in comparison to Burp suite.

That's the one major con of ZAP is the pitiful amount of documentation there is. The project is still active and contributed to though. Just no one's really writing guides.

#1

Check out the additional reading material.