CLIENT-NAME WEB APPLICATION AND INFRASTRUCTURE VULNERABILITY ASSESSMENT REPORT

Report for	Sample Penetration Test Report
Client contact	+1 (xxx) xxx xxx
Report title	Client Name: Web application security and Infrastructure vulnerability report
Date	2019
Version	1.0

Contents

1. Executive Summary

We were contracted by client-name to conduct Web Application and Infrastructure Vulnerability Assessment to determine if there were security weaknesses in the client-name website that can render the application insecure and allow an attacker to gain access to any data that is accessible via them or gain access to the underlying operating system.

The hosting infrastructure of the client-name website was also subjected to an External Vulnerability Assessment to simulate a real-world attacker trying to find vulnerabilities and flaws.

The assessment was carried out between date 1 and date 2 on the production web application at www.samplereport.co

OWASP Top 10 2013 was the reference frame work to evaluate and categorise the security issues.

Summary of Results

- The application was found to use weak credentials for its administrative accounts that resulted in a complete compromise of the application.
- There are a few security controls missing in places, especially around the implementation of security HTTP response headers.
- The current configuration of the application has multiple directories with world writable permissions on the server; i.e. any user on the server can write, delete and modify files in the web application.
- Multiple log files containing sensitive information were found on the server, that can be accessed by anyone with a link to the log files, revealing the internal workings of the website.

Conclusion

The web application present doesn't have the security controls to ensure protection against dictionary attacks and brute forcing of the login details. Additionally, weak password policy allowed full access to the application. Once we could login we were able to take over the application and run operating system commands on the server as a limited user.

Using the ability to run commands on the server, we could find additional vulnerabilities affecting the system, including directories that could be modified by any user on the system, weak passwords for the admin console of the SoftwareName app and backup files that contain a lot of sensitive information that could be accessed by any system user.

All these vulnerabilities have resulted in a system that is vulnerable to attack and full server compromise. These issues need to be fixed as a priority. Fixing these issues will give assurance to the users of this application.

2. Web Application & Infrastructure Vulnerability Assessment

Target Information

The purpose of this Web Application Security Testing and Vulnerability Assessment was to discover weaknesses, identify threats and vulnerabilities and security issues on the in-scope server.

The scope included the following hosts and types of testing:

Host/Product	Domain/IP Address	Platform	Software	Type of Testing
client-name Site	www.samplereport.co	Debian GNU/Linux 8	• Nginx X.X.X • SoftwareName X.X.X • WordPress 4.X.X	Blackbox Web Application and Infrastructure Vulnerability Assessment

Host/Product	Domain/IP Address	Platform	Open Ports	Type of Testing
client-name Site Hosting Infrastructure	www.samplereport.co	Debian GNU/Linux 8	80, 443	Blackbox Web Application and Infrastructure Vulnerability Assessment

Methodology

Testing Setup

We setup an attacker machine in the UK so that our attack traffic was close to the target. The attack traffic originated from the UK IP - XX.XX.XX.XX. This IP was provided to client-name before we began testing. The chain of traffic to the target was as below:

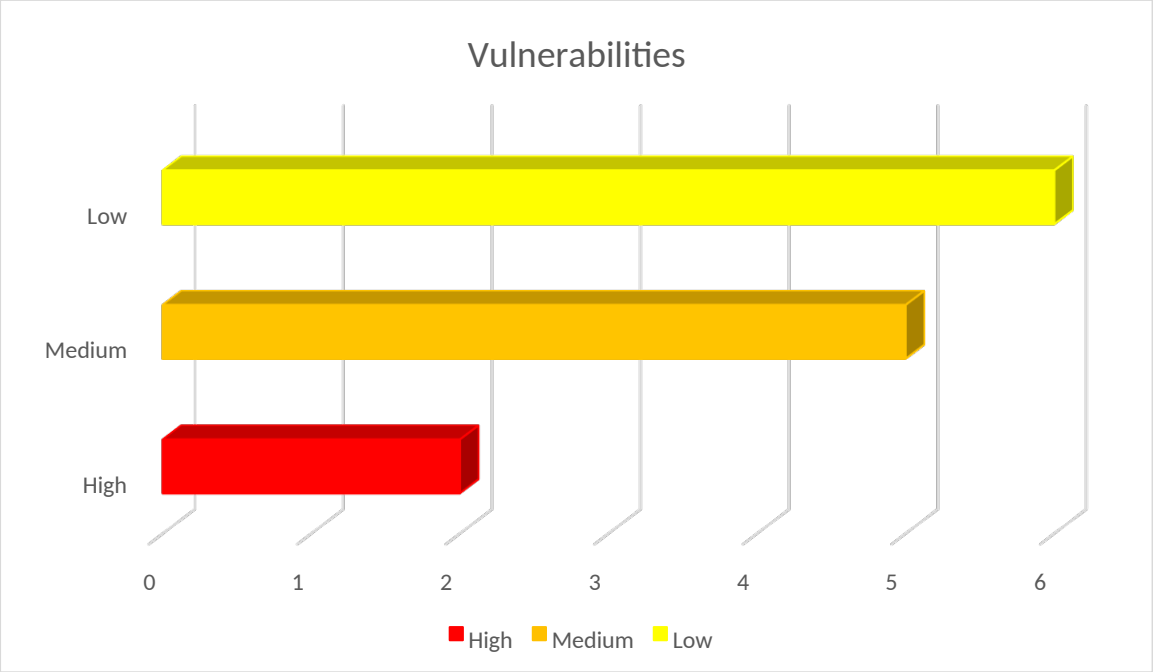
Browser > Burp Suite Pro > Secure SOCKS Tunnel > XX.XX.XX.XX > www.samplereport.co

Our Nessus scanner machine was connected to our UK IP via VPN using a OpenVPN connection to ensure all scanner traffic would go through the IP and end to end encryption was maintained.

3. List of vulnerabilities

1. An administrative user with weak credentials was identified
2. Multiple SoftwareName Admin users have weak password
3. MySQL password found in cleartext in a world readable file on the server
4. Application is vulnerable to Clickjacking attacks
5. Sensitive system information leaked via log files exposed over the Internet

6. Web Application and Database backup found as world readable files on the server
7. WordPress blog username enumeration possible
8. WordPress version older than current stable (readme.html found)
9. SoftwareName version older than current stable
10. Missing HSTS header from HTTPS Server
11. World writable directories discovered with weak permissions
12. Web server exposes its version number via response headers and body 13. Older versions of JavaScript libraries being used



Severity	Number
High	2
Medium	5
Low	6

4. An administrative user for the blog with weak credentials was identified

We could login into the client-name WordPress blog using a weak set of credentials. These credentials were easy to guess allowing us access to the application, data, functionality available within and to the underlying Operating System as well.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A2 - Broken Authentication and Session Management https://www.owasp.org/index.php/Top_10_2013-A2-Broken_Authentication_and_Session_Management	**CWE-521: Weak Password Requirements** https://cwe.mitre.org/data/definitions/521.html

Severity

High

Technical Description

The WordPress blog of client-name hosted at www.samplereport.co/blog/ is vulnerable to a weak password attack. The admin panel was accessible using the username and password combination of admin and DevBrandXX respectively.

The attack approach was as follows:

- At the bottom of the home page at www.samplereport.co we found the text "Powered by DevCompany"
- We did a Google search for the text and found the www.DevCompany.com website.
- This website had the text DevBrand as an image on the home page.
- Based on the two words, DevCompany and DevBrand we created a password list. This password list had various numbers appended to these two words (provided in Annexure 2).
- We then used wpscan[1] to run a brute force on www.samplereport.co/blog using the default username admin and the password list that was generated.
- We obtained a successful login with the username and password combination of admin and DevBrandXX
- Once we were logged in with WordPress admin privileges, we added a PHP file that could execute operating system commands. This file at /wp-content/plugins/xxxxxx/index.php was overwritten by a possible file integrity checker program
- We created another file that was capable of running operating system commands at /var/www/samplereport.co/htdocs/upload/filename.php and added some protection to prevent

1 wpscan is a tool that can be used to find vulnerabilities in WordPress. It also supports username enumeration and brute forcing of logins

other users from abusing this file.

- To execute a command, use this URL: www.samplereport.co/upload/filename.php?hash=5d62dbXXa25e1e86XXe36275ea1XX55fec050aef1XXa914e25a1c816cXXfd31d&passxxxxxxxxxxxxx=ifconfig
- This was all possible because of the weak credentials of the admin account.

Proof of Concept

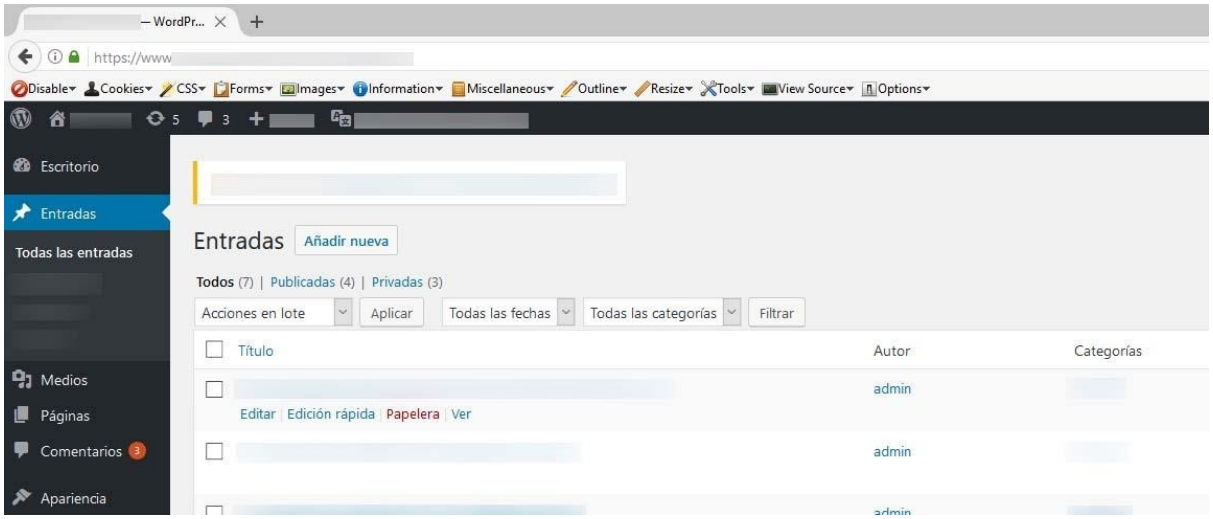


Figure 1: WordPress admin panel login

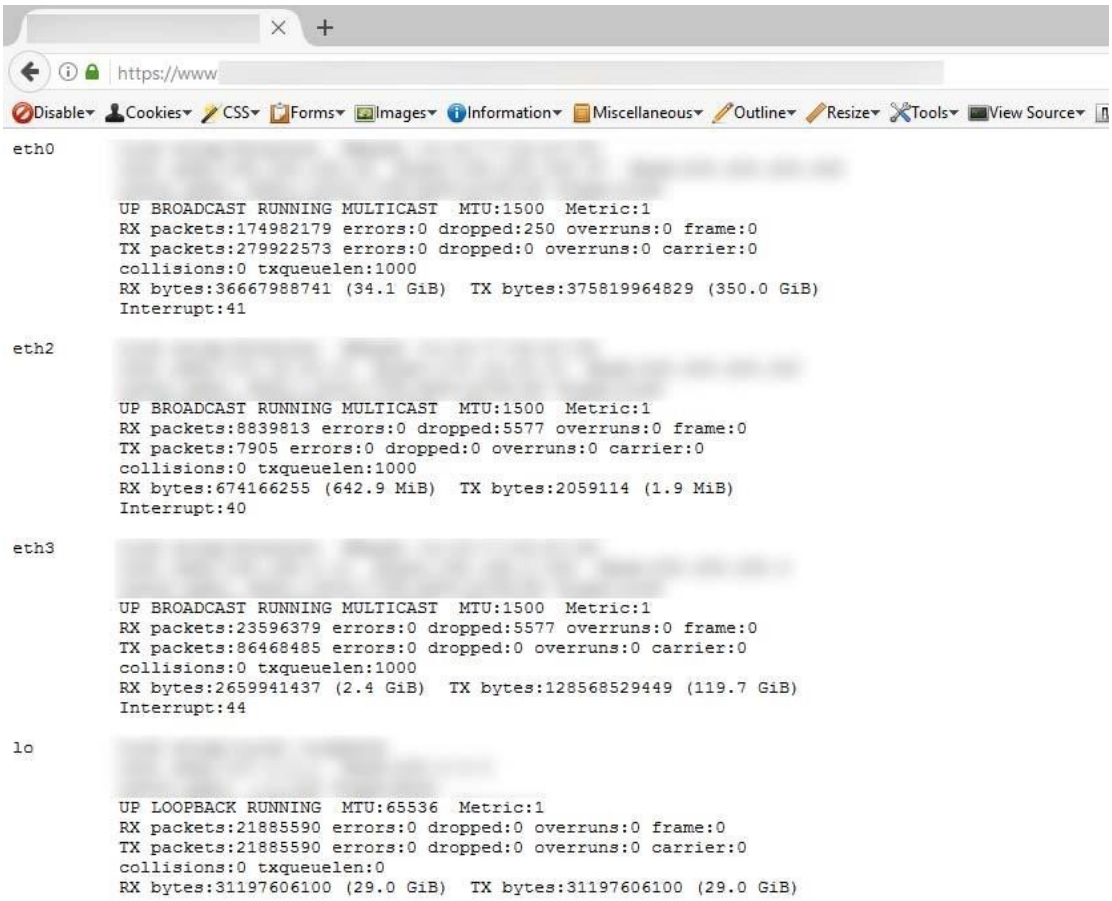


Figure 2: Code execution on the server after logging in as WordPress admin

So what?

An attacker may be able to use a weak password to gain access to the admin panel of the blog. From there, it is very easy to create PHP files that execute the attacker's code on the server thus allowing the attacker to run operating system commands on the server. This will result in a total server compromise.

We achieved this; we created a PHP file that would execute operating system commands on the server resulting in the compromise of user data and system resources without detection.

Mitigation

1. Change the passwords of the admin and other accounts.
2. Enforce usage of strong passwords. A password strength policy should be created using the recommendations as provided by the OWASP Authentication cheat sheet.

References

A great reference provided by OWASP is the PassFault website. This website allows you to analyse different types of passwords to get an idea on what is secure password. At the very least usernames or variations of that shouldn't be allowed to be set as passwords in any application.

- https://www.owasp.org/index.php/Authentication_Cheat_Sheet#Password_Complexity
- http://www.passfault.com/

5. Multiple SoftwareName Admin users have weak passwords

We could identify several SoftwareName admin accounts with weak passwords.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A2 - Broken Authentication and Session Management https://www.owasp.org/index.php/Top_10_2013-A2-Broken_Authentication_and_Session_Management	**CWE-521: Weak Password Requirements** https://cwe.mitre.org/data/definitions/521.html

Severity

High

Technical Description

Multiple admin users were discovered who had their password set to DevBrandXX. An attacker can use an admin account with this password to become a SoftwareName admin and gain complete control over the application.

The password is stored in the DB in the form of md5(salt+password). The salt is 473AI8Pho0rMxTWKFXXqfE6DFHYWhopXXgp26TFHobzD8NXX6UyguABi as obtained from the settings.inc.php file. The md5 value of the salt and 'DevBrandXX' combination is 97bb0a177523XXfbf6633a713caXX953. This value was searched through the xx_xxxxxxx table in the database and multiple entries were found.

Proof of Concept

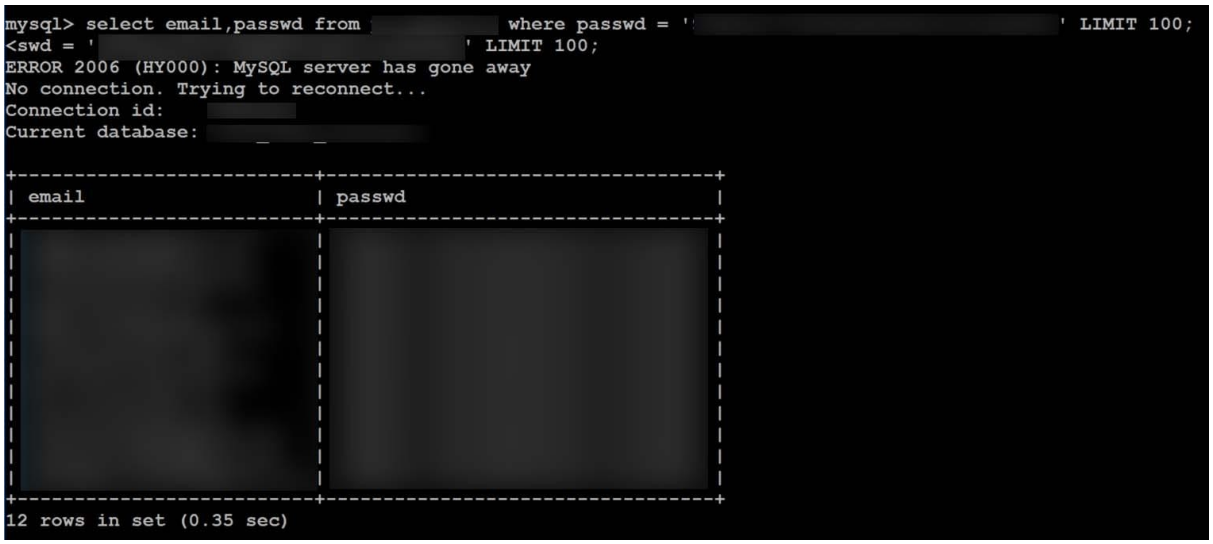


Figure 3: The SoftwareName admin users with the password 'DevBrandXX'

So what?

An attacker may be able to use a weak password and gain access to the admin panel of the shop. From there, it is very easy to view and edit customer data, transactions, shopping history, the look and feel of the site, the UI and the menus etc. Gaining access to a set of admin credentials will result in a total application compromise.

Mitigation

1. Change the passwords of the admin and other accounts.
2. Enforce usage of strong passwords. A password strength policy should be created using the recommendations as provided by the OWASP Authentication cheat sheet.

References

A great reference provided by OWASP is the PassFault website. This website allows you to analyse different types of passwords to get an idea on what is secure password. At the very least usernames or variations of that shouldn't be allowed to be set as passwords in any application.

- https://www.owasp.org/index.php/Authentication_Cheat_Sheet#Password_Complexity
- http://www.passfault.com/

6. MySQL password found in cleartext in a world readable file on the server

A file containing MySQL credentials was discovered on the web server in a world readable file. Any user who has access to the server can read the files to obtain the database credentials.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A6-Sensitive Data Exposure https://www.owasp.org/index.php/Top_10_2013-A6-Sensitive_Data_Exposure	**CWE-285: Improper Authorization** https://cwe.mitre.org/data/definitions/285.html

Severity

Medium

Technical Description

The following files have MySQL credentials in plaintext. These files have world readable permissions:

/home/ samplereport /xxxx/yyyyyy_aabb_zzzzfiles.sh /home/ samplereport /xxxx/yyyyyy_zzzzfiles.sh

The MySQL credentials discovered were:
usr_web:Xy123X1xyz4X

Proof of Concept

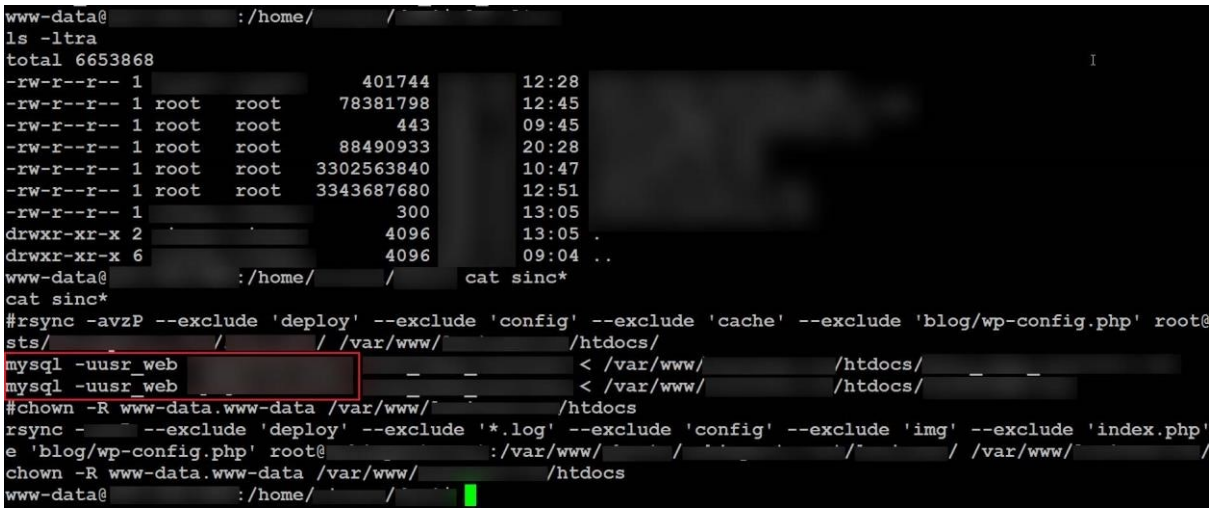


Figure 4: MySQL credentials discovered in a plaintext file on the server

So what?

A user with limited privileges can read these files and obtain the username and password to connect to the MySQL database. Once connected, the user will have the ability to see and access all data regarding the client-name blog and shop. This data includes user information, shopping history and payment information if any.

Mitigation

Change the permission on these files so that other users cannot read them. Also, use the mysql_config_editor[2] to generate a MySQL configuration file that contains the encrypted value of the password. The permissions on this file should also be restricted to prevent access by other users.

References:

- https://cwe.mitre.org/data/definitions/521.html
- https://opensourcedbms.com/dbms/passwordless-authentication-usingmysql_config_editor-with-mysql-5-6/

2 mysql_config_editor is a program that gets installed as part of the mysql-client suite of utilities. To install this utility, run *sudo apt-get install mysql-client-5.6*

7. Application is vulnerable to Clickjacking attacks

The X-Frame-Options header that has not been set on the application. If a page fails to set an appropriate X-Frame-Options, it can be possible for a page controlled by an attacker to load it within an iframe. This may enable a clickjacking attack, in which the attacker's page overlays the target application's interface with a different interface provided by the attacker.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A5-Security Misconfiguration https://www.owasp.org/index.php/Top_10_2013-A5-Security_Misconfiguration	**CWE-693: Protection Mechanism Failure** https://cwe.mitre.org/data/definitions/693.html **CWE-451: User Interface (UI) Misrepresentation of Critical Information** https://cwe.mitre.org/data/definitions/451.html

Severity

Medium

Technical Description

The application server does not set the X-Frame-Options header allowing the application to be loaded in an iframe. This can lead to Clickjacking attacks where the attacker can trick a user to click on HTML elements in the application by loading it in a hidden iframe.

Proof of Concept

Figure 5: Missing X-Frame Options Header in HTTP Response

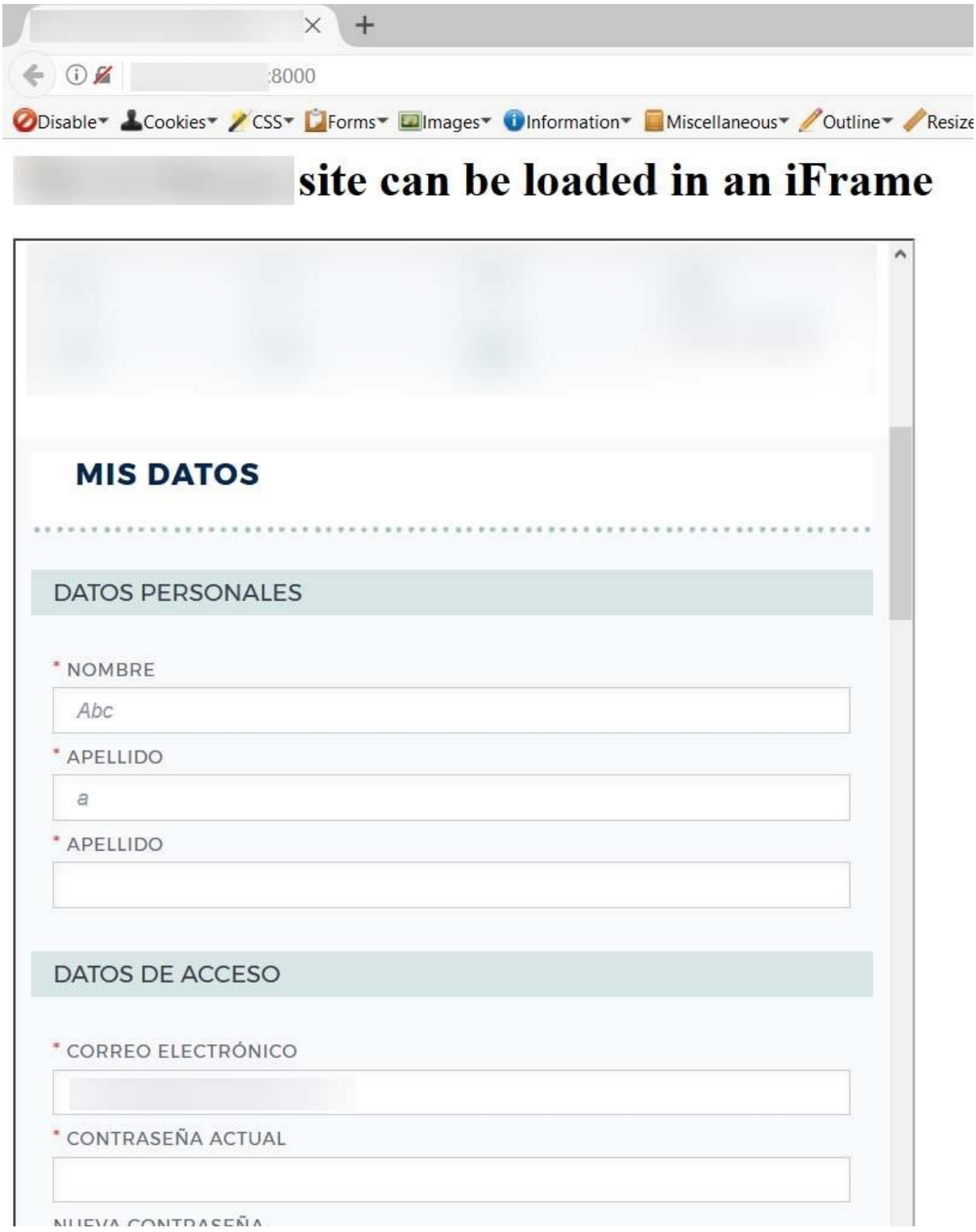


Figure 6: The client-name user account page loaded in an iframe making clickjacking attacks possible

So what?

An attacker can load any of the pages that are available via the application and trick a user to perform mouse clicks or send keystrokes causing an unwitting action to be performed. An attacker can target any functionality of the application that a user has access to by tricking the user into performing mouse clicks or send keystrokes that can result in adding of new data or modifying/deleting existing information available in the application.

Mitigation

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. This can be done in nginx by adding the following to the `nginx.conf` or the site configuration file in the `sites-enabled` directory, in the server section:

```
add_header X-Frame-Options SAMEORIGIN;
```

References

- https://www.owasp.org/index.php/Clickjacking_Defense_Cheat_Sheet
- http://blog.kotowicz.net/2009/12/5-ways-to-prevent-clickjacking-on-your.html
- https://geekflare.com/add-x-frame-options-nginx/

8. Sensitive system information leaked via log files exposed over the Internet

The client-name application discloses sensitive information via log files that are stored in webroot and which can be accessed via the browser.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A5-Security Misconfiguration https://www.owasp.org/index.php/Top_10_2013-A5-Security_Misconfiguration	**CWE-200: Information Exposure** https://cwe.mitre.org/data/definitions/200.html

Severity

Medium

Technical Description

The www.samplereport.co/log/ directory contains log files that have easy to predict log filenames. An attacker can enumerate and download these log files since they are in a public facing directory. These log files contain a wealth of information in the form of error messages, debug messages and failed queries. Table and database names are disclosed through these log files.

The list of log filenames that we were able to enumerate are

12345123_exception.log	12345123_exception.log	12345123_exception.log
12345123_exception.log	12345123_exception.log	12345123_exception.log
12345123_exception.log	12345123_exception.log	12345123_exception.log
12345123_exception.log	12345123_exception.log	12345123_exception.log
12345123_exception.log	12345123_exception.log	12345123_exception.log
12345123_exception.log	12345123_exception.log	12345123_exception.log
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12345123_exception.log 12345123_exception.log 12345123_exception.log
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Proof of Concept

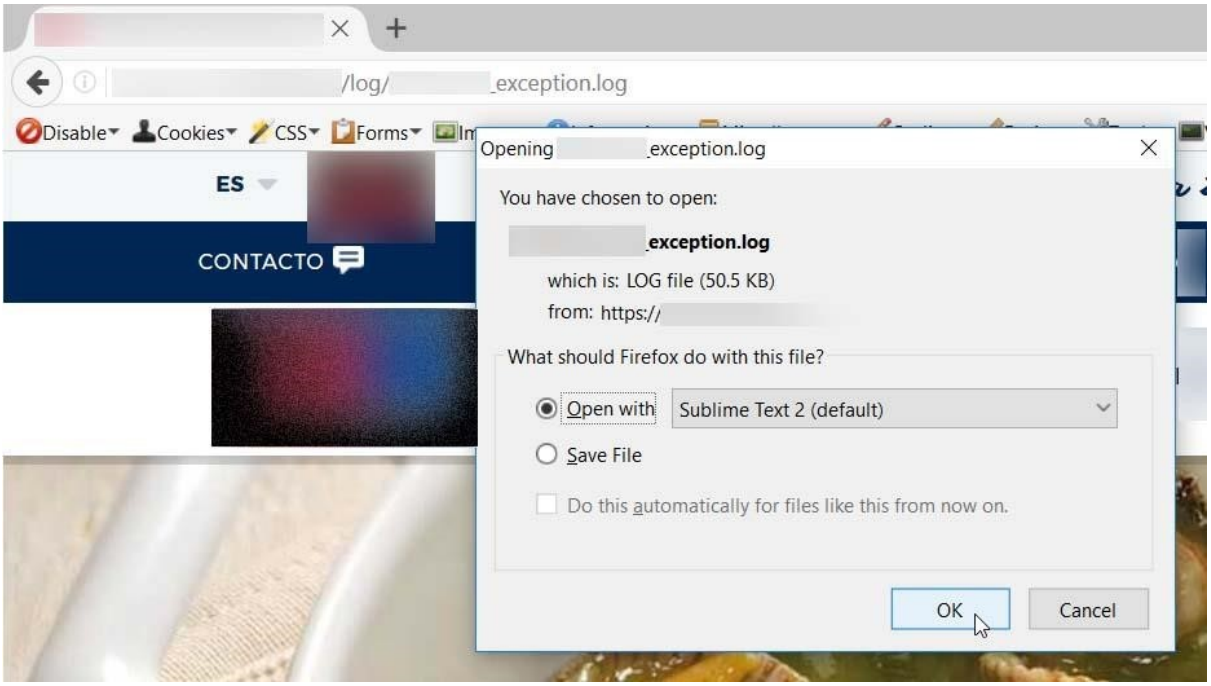

Figure 7: Log file in a publicly accessible directory

Figure 8: One of the log files containing sensitive data. In this case SQL queries that reveal table and column names.

So what?

An attacker can use the error messages contained within these files to perform additional attacks on the application. These files contained detailed error messages that contain database name, table and column information and other SQL errors.

Mitigation

Move the log files to a directory outside webroot. Also, make sure that the log files do not contain any sensitive information like credit card numbers, PII or credentials.

The server can also be configured to prevent .log files from being served using the following configuration inside the server section of the site configuration file or the `nginx.conf` file

```
location ~ \.log$ {
return 403;
}
```

References

- https://www.owasp.org/index.php/Information_Leakage
- http://stackoverflow.com/questions/8286214/how-to-block-all-file-extensions-of-certaintypes-on-nginx

9. Web Application and Database backup found as world readable files on the server

A copy of the database and web application directory were found as backup files in the home directory of a system user. These files had world readable permissions allowing any user on the system to access these files and read their contents.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A5-Security Misconfiguration https://www.owasp.org/index.php/Top_10_2013-A5-Security_Misconfiguration	**CWE-200: Information Exposure** https://cwe.mitre.org/data/definitions/200.html

Severity

Medium

Technical Description

The following files containing the MySQL database backup and the website backup were found. These files have world readable permissions:

/home/xxxx/vvvv/live_backup.sql
/home/xxxx/vvvv/ samplewebsite.tar
/home/xxxx/yyyy/htdocs_XX-XX-XX.tar

To find world readable files run the following command:

```
find /home/ -type f -perm -o=r -exec ls -ltra {} \;
```

Proof of Concept

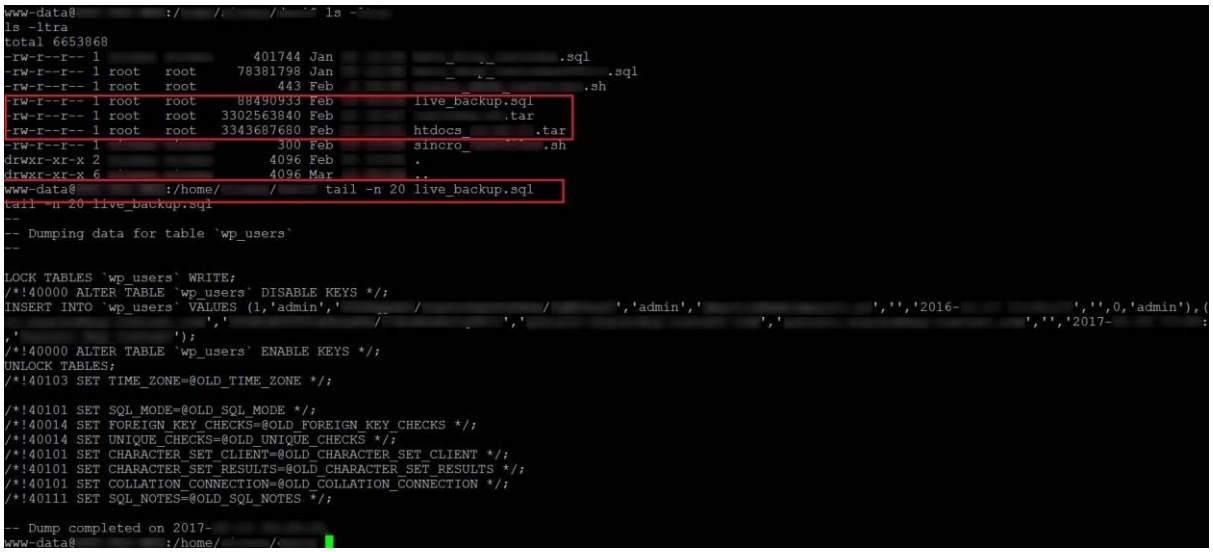

Figure 9: Backup files found on the server with world readable permissions

So what?

A user with limited privileges can read these files and gain access to all data that was backed up. The database backup contains information about the client-name blog and shop. The data in the backups may include website files, custom source code, user information, shopping history and payment information.

Mitigation

Change the permission on these files so that other users cannot read them. These files should not be accessible to non-root users or only to users who have been designated as system backup operators.

References

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

10. WordPress blog username enumeration possible

It is possible to enumerate the users of the WordPress blog inside the client-name site.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A5-Security Misconfiguration https://www.owasp.org/index.php/Top_10_2013-A5-Security_Misconfiguration	**CWE-200: Information Exposure** https://cwe.mitre.org/data/definitions/200.html

Severity

Medium

Technical Description

The WordPress installation does not offer any protection for username enumeration. It was possible to list the users in WordPress using wpscan and by manual methods as well.

Using wpscan we can enumerate users by running the command: wpscan -u www.samplereport.co/blog/ --enumerate u

Manually, it is possible to enumerate users by following the redirection of pages when browsing to the following URLs:

www.samplereport.co/blog/?author=1
www.samplereport.co/blog/?author=2
www.samplereport.co/blog/?author=3
www.samplereport.co/blog/?author=4
www.samplereport.co/blog/?author=5

Proof of Concept

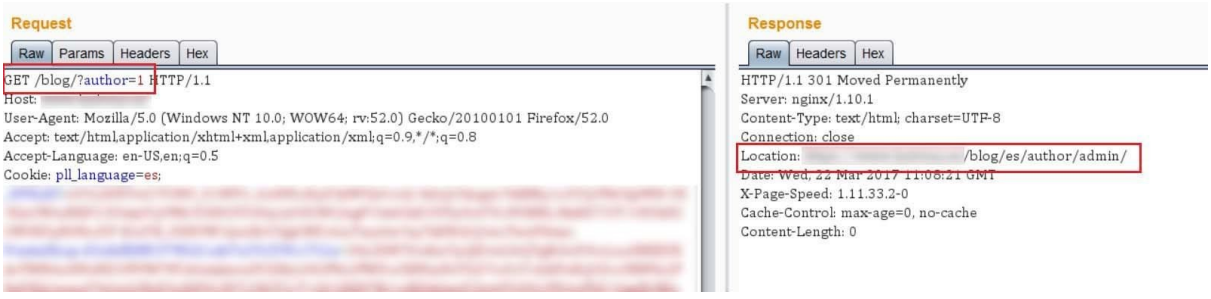

Figure 10: Username enumeration possible via HTTP redirects

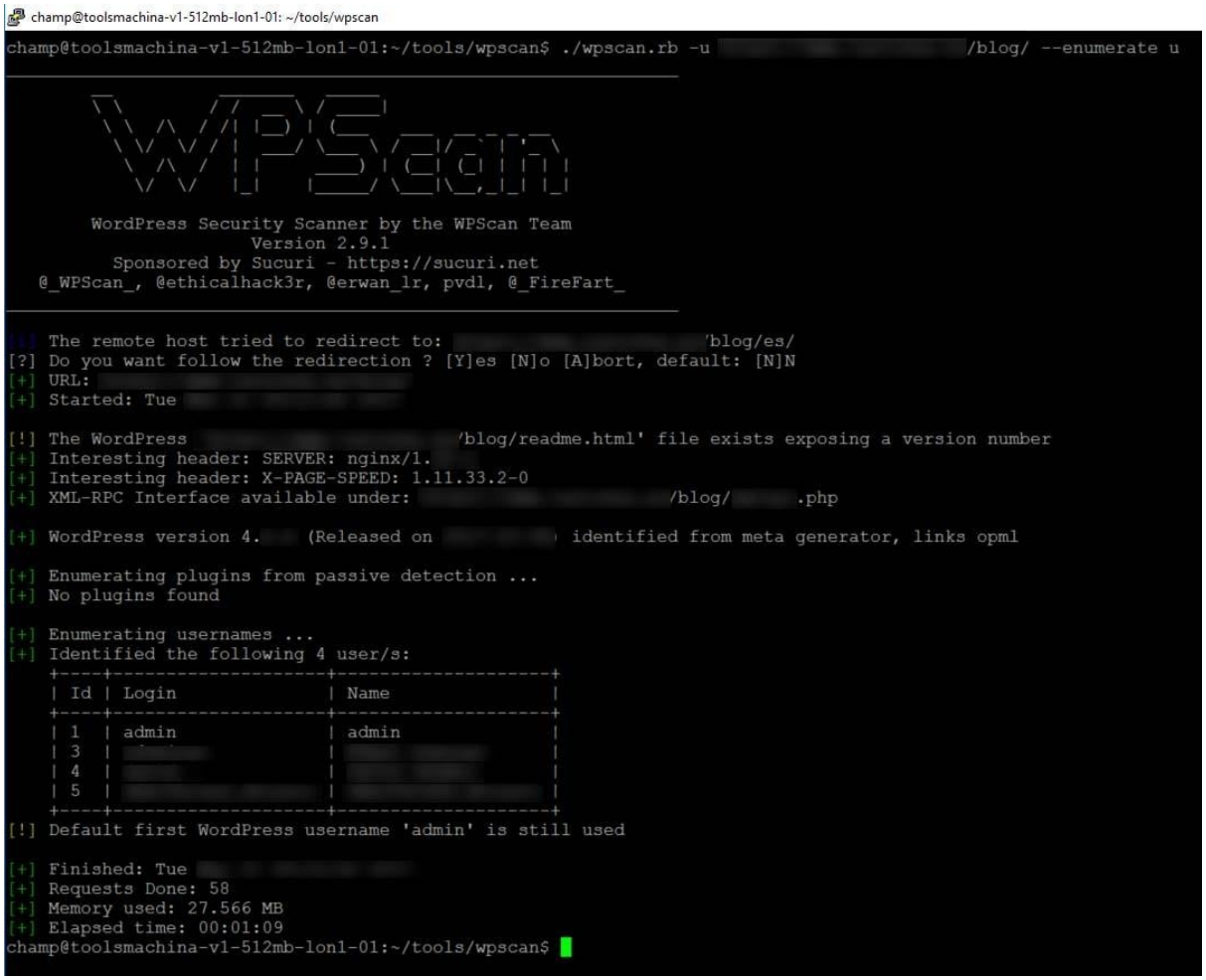

Figure 11: Username enumeration possible via wpscan

So what?

An attacker can enumerate usernames to attempt password brute force attacks. To brute force and successfully login into the blog administration portal, two key things are required, a valid username and its password. This vulnerability exposes the username which can be used in conjunction with a large password list to brute force the account and login to the application. This will result in the compromise of the application and consequently with the help of other vulnerabilities that may exist post login, a compromise of the underlying system.

Mitigation

Block or redirect any requests to `/?author` using the nginx configuration on the server.

Edit the webserver's configuration to add rules to rewrite the location when an attempt is made to access the /?author request from the URL. This should be done inside the server section of the configuration.

An example of the nginx configuration with this enabled is shown below:

```
if ($args ~ "^/?author=([0-9]*)"){
set $rule_0 1$rule_0;
     }
     if ($rule_0 =
"1"){
        rewrite ^/$ www.samplereport.co/blog/404 permanent;
     }
```

References

- https://www.owasp.org/index.php/Information_Leakage
- http://www.edwiget.name/2013/10/blocking-wordpress-user-enumeration-on-nginx/

11. WordPress version older than current stable (readme.html found)

The version of WordPress running on the server (4.X.X) is older than the current stable release (4.7).

Mapping to OWASP/CWE

OWASP Top 10 2013 – A9- Using Components with Known Vulnerabilities https://www.owasp.org/index.php/Top_10_2013-A9-Using_Components_with_Known_Vulnerabilities	**CWE-200: Information Exposure** https://cwe.mitre.org/data/definitions/200.html

Severity

Low

Technical Description

The website has a sub folder called /blog that has a WordPress instance running. This instance of WordPress is at version 4.X.X. The latest stable version is 4.7.3 as of XX March 2017.

The version number of the installed WordPress was discovered via the readme.html file located at: www.samplereport.co/blog/readme.html

Proof of Concept

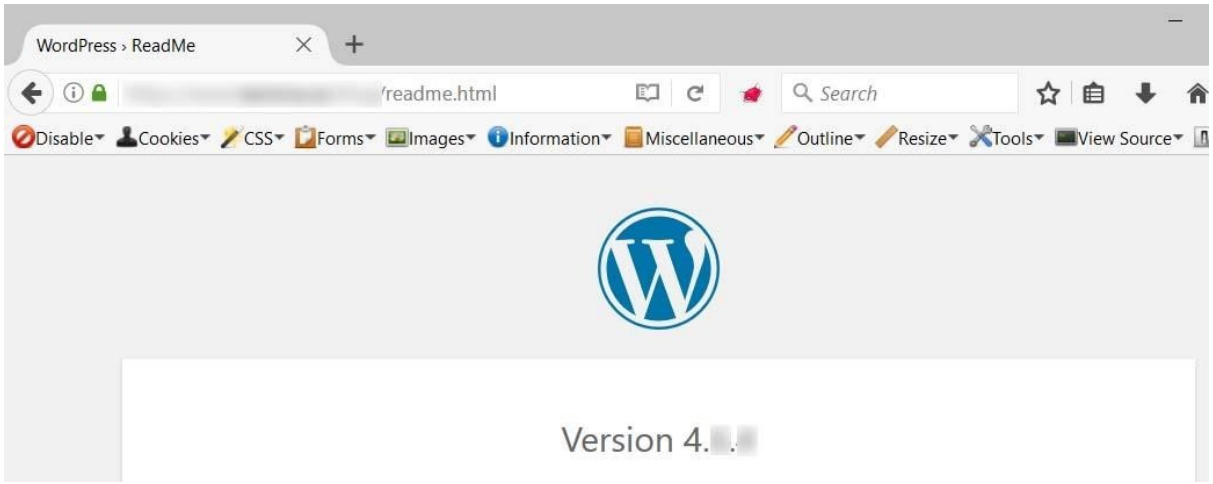

Figure 12: Version of WordPress is older than current stable release of 4.7 (as of XX March 2017)

So what?

Systems running software with older versions may become vulnerable due to weakness in the running software. An attacker may use publicly disclosed vulnerabilities to gain access to the application data or user information resulting in a possible compromise of the application or the server running the application.

Mitigation

Upgrade to the latest version of WordPress. WordPress administrators receive update notifications in the admin dashboard which can be used to start the upgrade process. Independently, you can also obtain the latest version of WordPress from the vendor site at https://wordpress.org/.

Use the following techniques to remove the version number from the other areas of the application as well:

1. Delete the readme.html file from webroot as this gives away the version of WordPress.
2. Add the following lines of php code to the end of the `functions.php` file found in your `/wp-content/themes/your-theme-name/` folder.

```
remove_action('wp_head',
'wp_generator'); function
remove_version() { return ''; }
add_filter('the_generator', 'remove_version');
```

References

- https://www.owasp.org/index.php/Top_10_2013-A9Using_Components_with_Known_Vulnerabilities
- https://codex.wordpress.org/Updating_WordPress

12. SoftwareName version older than current stable

The version of SoftwareName running on the server (X.X.X) is older than the current stable release (Y.Y).

Mapping to OWASP/CWE

OWASP Top 10 2013 – A9- Using Components with Known Vulnerabilities https://www.owasp.org/index.php/Top_10_2013-A9-Using_Components_with_Known_Vulnerabilities	**CWE-200: Information Exposure** https://cwe.mitre.org/data/definitions/200.html

Severity

Low

Technical Description

The website is primarily running a SoftwareName instance. This instance of SoftwareName is at is at version X.X.X. The latest stable version is Y.Y as of XX March 2017.

The version number of the installed SoftwareName was discovered by reading the contents of /var/www/samplereport.co /htdocs/config/settings.inc.php

Proof of Concept

Figure 13: Version of SoftwareName is older than current stable release of Y.Y (as of XX March 2017)

So what?

Systems running software with older versions may become vulnerable due to weakness in the running software. An attacker may use publicly disclosed vulnerabilities to gain access to the application data or user information resulting in a possible compromise of the application or the server running the application.

Mitigation

Upgrade to the latest version of SoftwareName.

References

- https://www.owasp.org/index.php/Top_10_2013-A9Using_Components_with_Known_Vulnerabilities
- http://doc.SoftwareName.com/display/PS16/Automatic+update

13. Missing HSTS header from HTTPS Server

The application fails to prevent users from connecting to it over unencrypted connections.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A5-Security Misconfiguration https://www.owasp.org/index.php/Top_10_2013-A5-Security_Misconfiguration	**CWE – Not available**

Severity

Low

Technical Description

The HTTP "Strict-Transport-Security" header is missing in the HTTPS responses from the application server. The lack of HSTS allows downgrade attacks, SSL-stripping man-in-the-middle attacks, and weakens cookie-hijacking protections.

Proof of Concept

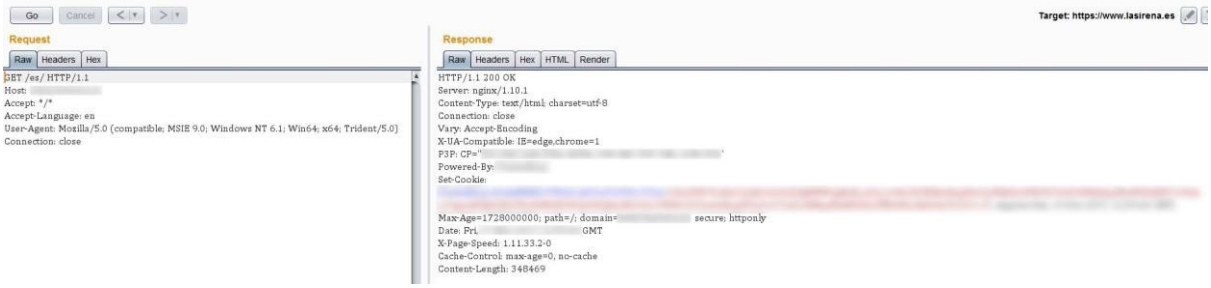

Figure 14: Missing strict transport security header in the response header

So what?

An attacker able to modify a legitimate user's network traffic could bypass the application's use of SSL/TLS encryption, and use the application as a platform for attacks against its users. This attack is performed by rewriting HTTPS links as HTTP, so that if a targeted user follows a link to the site from an HTTP page, their browser never attempts to use an encrypted connection.

Mitigation

A Strict-Transport-Security HTTP header should be sent with each HTTPS response. The syntax

`Strict-Transport-Security: max-age=<seconds>[; includeSubDomains]`

The parameter max-age gives the time frame for requirement of HTTPS in seconds and should be chosen quite high, e.g. several months. The flag includeSubDomains defines that the policy applies also for sub domains of the sender of the response. This will ensure that a supported browser will enforce secure connection while communicating with the application.

Reference

- https://www.owasp.org/index.php/HTTP_Strict_Transport_Security_Cheat_Sheet
- https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Strict-Transport-Security

14. World writable directories discovered with weak permissions

Several directories were discovered in the web root folder that had weak permissions set on them. These directories had world writable permissions set, allowing any user on the system to add/modify/delete content inside them.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A5-Security Misconfiguration https://www.owasp.org/index.php/Top_10_2013-A5-Security_Misconfiguration	**CWE-693: Protection Mechanism Failure** https://cwe.mitre.org/data/definitions/693.html

Severity

Low

Technical Description

Using the shell that was uploaded using the weak WordPress credentials (see vulnerability 1 - An administrative user for the blog with weak credentials was identified), we could identify directories that have weak permissions. These permissions allow any user on the system to write to into these folders.

www.samplereport.co/upload/filename.php?hash=5d62dbXXa25e1e86XXe36275ea1XX55fec050aef1XXa914e25a1c816cXXfd31d&passxxxxxxxxxxxxxx =ls%20-ltrad%20/var/www/ samplereport.co /htdocs/*/%20|%20grep%20drwxrwxrwx Without the encoded characters, the URL is

www.samplereport.co/upload/filename.php?hash=5d62dbXXa25e1e86XXe36275ea1XX55fec050aef1XXa914e25a1c816cXXfd31d&passxxxxxxxxxxxxxx =ls -ltrad /var/www/samplereport.co/htdocs/*/ | grep drwxrwxrwx

The following directories were found to have world read and writable permissions set

1. /var/www/samplereport.co/htdocs/xxxxxx/
2. /var/www/samplereport.co/htdocs/yyyyyy/
3. /var/www/samplereport.co/htdocs/zzzzzz/
4. /var/www/samplereport.co/htdocs/aaaaaa/
5. /var/www/ samplereport.co /htdocs/bbbbb/
6. /var/www/ samplereport.co /htdocs/cccccc/
7. /var/www/ samplereport.co /htdocs/ddddd/

Proof of Concept

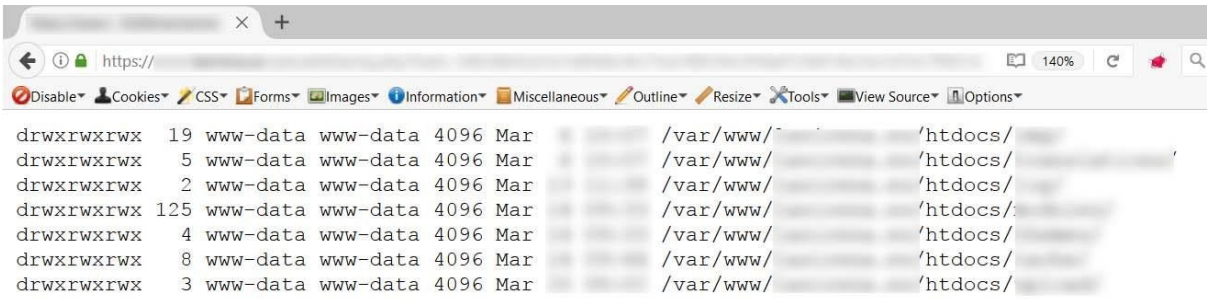

Figure 15: Several directories in webroot were found to have weak permissions

So what?

A system user can create/edit files inside the directories. A malicious file can be created that steals client-name shop's user's passwords, tokens or payment information resulting in data and confidentiality loss for the site's users.

Mitigation

Remove world write permissions on directories inside webroot using the chmod command.

The following is an example of the chmod command to remove world write permission on a folder:

```
chmod 775 directory_name
```

So, to remove the world writable `permission` on `/var/www/ samplereport.co /htdocs/ upload` folder run the following command:

```
chmod 775 /var/www/ samplereport.co/htdocs/upload
```

References

- https://www.owasp.org/index.php/Top_10_2013-A5-Security_Misconfiguration
- https://www.owasp.org/index.php/File_System#Insecure_permissions

15. Web server exposes its version number via response headers & body

The server software versions used by the application are revealed by the web server in the response header and the response body when access restricted folders/files.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A5-Security Misconfiguration https://www.owasp.org/index.php/Top_10_2013-A5-Security_Misconfiguration	**CWE-200: Information Exposure** https://cwe.mitre.org/data/definitions/200.html

Severity

Low

Technical Description

The webserver is configured to send the version of nginx to the client. The version number is exposed via the response header and in the body of the page when accessing a restricted directory. The version number of nginx is X.X.X as obtained from this misconfiguration.

A HTTP response to any page on the site will have the nginx version in the response header as shown in the screenshots.

A HTTP response to a restricted directory like /backoffice will have the nginx version in the response body as shown in the screenshots.

Proof of Concept

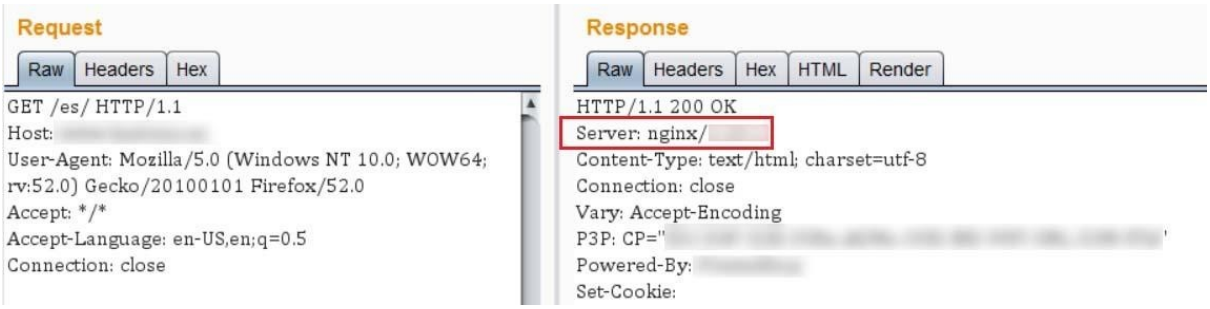

Figure 16: The HTTP response headers contain version number of the nginx server

Figure 17: The HTTP response body contains the version number of the nginx server

So what?

Systems running software with older versions may become vulnerable due to weakness in the running software. An attacker may use publicly disclosed vulnerabilities to gain access to the application data or user information resulting in a possible compromise of the application or the server running the application.

Mitigation

To hide the version of nginx in the response header and body, set the server_tokens value in the nginx configuration file to Off. This will prevent the server from disclosing the version information.

The nginx configuration file is present at `/etc/nginx/nginx.conf`

References

1. https://www.owasp.org/index.php/Information_Leakage
2. https://www.digitalocean.com/community/tutorials/how-to-secure-nginx-on-ubuntu-14-04

16. Older versions of JavaScript libraries being used

The client-name SoftwareName application as well as the WordPress blog, both use older versions of JavaScript libraries that are vulnerable to attacks.

The JavaScript file jquery-X.X.X.min.js and the JavaScript file jquery-migrate-X.X.X.min.js include a vulnerable version of the library 'jquery'.

Mapping to OWASP/CWE

OWASP Top 10 2013 – A9- Using Components with Known Vulnerabilities https://www.owasp.org/index.php/Top_10_2013-A9-Using_Components_with_Known_Vulnerabilities	**CWE-200: Information Exposure** https://cwe.mitre.org/data/definitions/200.html

Severity

Low

Technical Description

The application uses older versions of the jQuery library. The versions found to be in use are jQuery - v X.X.X and jQuery migrate - v X.X.X. The version numbers can be obtained by accessing the files at: www.samplereport.co/js/jquery/jquery-migrate-X.X.X.min.js www.samplereport.co/js/jquery/jquery-X.X.X.min.js

Proof of Concept

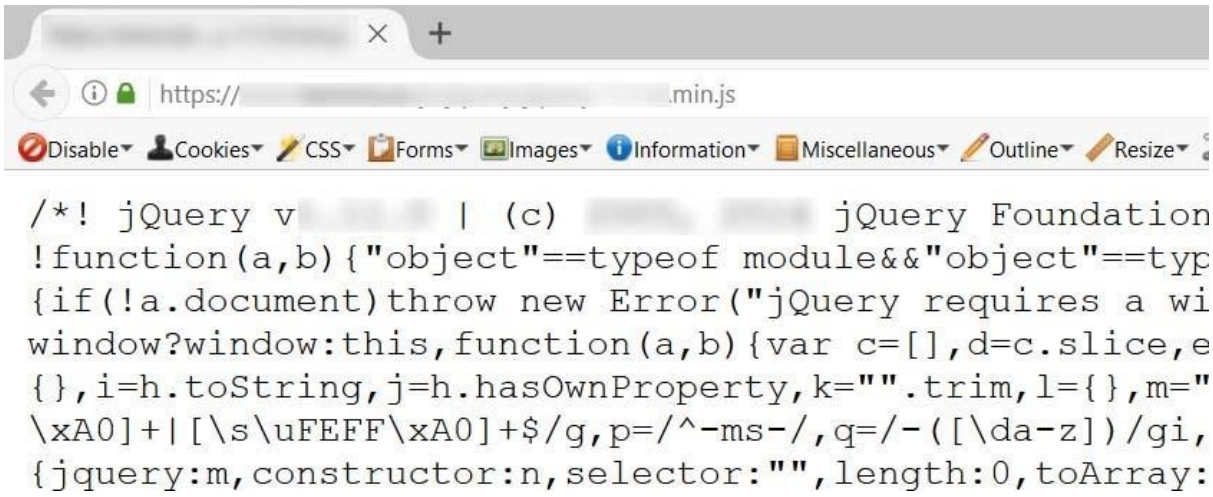

Figure 18: jQuery version at X.X.X

Figure 19: jQuery-migrate at v X.Y.X

So what?

It may be possible for an attacker to load JavaScript in the browser using a jQuery call. This JavaScript can be used to perform any action as a client-name user since it will be running in the context of the client-name website.

Ideally, using JQuery, applications should not be able to execute JavaScript from third party domains.

Mitigation

Update to the latest version of JQuery via the vendor site: https://jquery.com/download/. The current version, as of this report, is 3.2.0 (as of XX March 2017)

References

- https://www.owasp.org/index.php/Top_10_2013-A9-Using_Components_with_Known_Vulnerabilities

17. Conclusion

The application at https://www.samplereport.co and its hosting infrastructure were subjected to a Web Application Security Test and a Vulnerability Assessment to identify weaknesses that can render the application insecure and allow an attacker to gain access to any data that is accessible via them or gain access to the underlying operating system.

The web application present doesn't have the security controls to ensure protection against dictionary attacks and brute forcing of the login details. Additionally, weak password policy allowed full access to the application. Once we could login we were able to take over the application and also run operating system commands on the server as a limited user.

Using the ability to run commands on the server, we were able to find additional vulnerabilities affecting the system, including directories that could be modified by any user on the system, weak passwords for the admin console of the SoftwareName app and backup files that contain a lot of sensitive information that could be accessed by any system user.

All these vulnerabilities have resulted in a system that is vulnerable to attack and full server compromise. These issues need to be fixed as a priority. Fixing these issues will give assurance to the users of this application.

18. Annexure 1: Artefacts created on the client-name server and application

The following objects were created either on the server or in the application. Please remove them once verification of this report has been completed.

1. Backdoor shell at /var/www/samplereport.co/htdocs/upload/xxx.php

   This file was created to run commands on the operating system as part of the assessment. All commands that were run were non-intrusive. No other files were created on the server apart from this file.

   This file can be accessed using a web browser and a secret hash. For example www.samplereport.co/upload/filename.php?hash=5d62dbXXa25e1e86XXe36275ea1XX55fec050aef1XXa914e25a1c816cXXfd31d&passxxxxxxxxxxxxx =ifconfig

2. A user with username yyyyyyyy@xxxxxxxx.com was created as part of the test. This user was created on the client-name SoftwareName instance using the register new user functionality of the application.

19. Annexure 2: Password list used to brute force WordPress login

The following list of strings were put into a file called passwordlist.txt and used to brute force the login for the WordPress admin user.

```
DevCompany
DevCompany
DevCompany
DevCompany
DevBrand
DevBrand
DevCompany0
DevCompany0
DevCompany0
DevCompany0
DevBrand0
DevBrand0
DevCompany1
DevCompany1
DevCompany1
DevCompany1
DevBrand1
DevBrand1
DevCompany00
DevCompany00
DevCompany00
DevCompany00
DevBrand00
DevBrand00
DevCompany11
DevCompany11
DevCompany11
DevCompany11
DevBrand11
DevBrand11
```