Cyberscope

Penetration Test Report
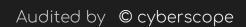# **Flux**

December 2024

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Review

Domain	https://runonflux.com
Assessment Scope	Landing Page

Audit Updates

Initial Audit	16 Dec 2024

Overview

Cyberscope has conducted a comprehensive penetration test on the web application "Flux" hosted at https://runonflux.com. This report focuses on evaluating the security and performance aspects of the web application. The assessment encompasses various facets of the application, including but not limited to authentication and authorization mechanisms, data handling and storage practices, network security measures, and response to high traffic volumes.

The expansion of blockchain technology has introduced a myriad of innovative applications, each with its own unique security challenges. Tenex as a prime example within the realm of digital currency ecosystems, ensures robust protection of user data and system integrity.

Penetration Assessment Scope

The scope of this assessment extends to identifying vulnerabilities and weaknesses in the application's architecture and functionality, with the aim of providing actionable recommendations to enhance its security posture. The evaluation focused specifically on the landing page of the web app. The assessment included only the landing page of the web app. The report aims to offer a comprehensive understanding of the application's strengths and areas for improvement, facilitating informed decision-making to mitigate risks, fortify against potential cyber threats, and bolster overall security resilience.

Web Technologies

Technology	Category	Version
React	JavaScript Frameworks	N/A
Next.js	Web Frameworks	13.5.6
Cloudflare	CDN	N/A
Google Analytics	Analytics	GA4
Ethers	JavaScript Libraries	N/A
core-js	JavaScript Libraries	3.36.1
Webpack	Miscellaneous	N/A
Open Graph	Miscellaneous	N/A

Findings Breakdown

	Critical	0
	Medium	0
	Minor / Informative	7

Severity	Unresolved	Acknowledged	Resolved	Other
● Critical	0	0	0	0
● Medium	0	0	0	0
● Minor / Informative	7	0	0	0

Diagnostics

● Critical   ● Medium   ● Minor / Informative

Severity	Code	Description	Status
●	LTC	Latency And Throughput Challenges	Unresolved
●	MACH	Missing Anti-Clickjacking Header	Unresolved
●	MCSPH	Missing Content Security Policy (CSP) Header	Unresolved
●	MCHSF	Missing Cookie HttpOnly and Secure Flags	Unresolved
●	MSTSH	Missing Strict Transport Security Header	Unresolved
●	MXH	Missing X-Content-Type-Options Header	Unresolved
●	SIUL	Server Instability Under Load	Unresolved

LTC - Latency And Throughput Challenges

Criticality	Minor / Informative
Status	Unresolved

Description

As part of the rate-limiting test, the web app highlighted concerns regarding latency and throughput, with varying response times across percentiles and an average latency of 1638.46 milliseconds. Additionally, fluctuations in data transfer rates indicate potential bottlenecks or inefficiencies in data processing and transmission, impacting system performance.

Stat	Avg	Stdev	Min	Max
Latency	1,638.46 ms	2,005.71 ms	156 ms	15,267 ms
Req/Sec	1,049.64	176.73	180	1380
Bytes/Sec	2.99 MB	0.5 MB	0.51 MB	3.93 MB

Recommendation

To enhance system performance, a comprehensive performance analysis is recommended. This analysis should focus on identifying and addressing latency bottlenecks, such as inefficient database queries, resource-intensive operations, or network congestion. Optimization efforts should target the codebase, database queries, and network configurations to improve response times and enhance overall system throughput, resulting in a smoother user experience and improved system efficiency.

MACH - Missing Anti-Clickjacking Header

Criticality	Minor / Informative
Status	Unresolved

Description

The absence of an Anti-Clickjacking header exposes the application to potential Clickjacking attacks. Clickjacking is a malicious technique that tricks users into clicking on unintended elements by disguising them as legitimate UI elements. This can lead to unauthorized actions being performed without the user's knowledge or consent. Without proper protection mechanisms in place, attackers can exploit Clickjacking vulnerabilities to perform actions on behalf of users, such as making purchases, changing account settings, or clicking on malicious links.

The response from the following URLs does not include either Content-Security-Policy with 'frame-ancestors' directive or X-Frame-Options to protect against 'ClickJacking' attacks.

1. https://runonflux.com
2. https://runonflux.com/

Recommendation

Modern Web browsers support the Content-Security-Policy and X-Frame-Options HTTP headers. The team is advised to ensure one of them is set on all web pages returned by the site/app.

If the team expects the page to be framed only by pages on their server (e.g. it's part of a FRAMESET) then they'll want to use SAMEORIGIN, otherwise if the team never expects the page to be framed, they should use DENY. Alternatively, the team could consider implementing Content Security Policy's "frame-ancestors" directive.

Reference: https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/X-Frame-Options

MCSPH - Missing Content Security Policy (CSP) Header

Criticality	Minor / Informative
Status	Unresolved

Description

Content Security Policy (CSP) is an added layer of security that helps to detect and mitigate certain types of attacks, including Cross Site Scripting (XSS) and data injection attacks. These attacks are used for everything from data theft to site defacement or distribution of malware. CSP provides a set of standard HTTP headers that allow website owners to declare approved sources of content that browsers should be allowed to load on that page — covered types are JavaScript, CSS, HTML frames, fonts, images and embeddable objects such as Java applets, ActiveX, audio and video files.

The following URLs are missing the Content Security Policy (CSP) header.

1. https://runonflux.com
2. https://runonflux.com/
3. https://runonflux.com/robots.txt
4. https://runonflux.com/sitemap.xml

Recommendation

To address the absence of Content Security Policy (CSP) headers and enhance the security of the application, the following steps are recommended:

- Verify that your web server, application server, load balancer, or any other relevant components are properly configured to set the Content-Security-Policy header in HTTP responses.
- Define a comprehensive CSP policy tailored to the specific requirements and functionalities of your application. Consider including directives such as default-src, script-src, style-src, img-src, font-src, connect-src, frame-src, media-src, object-src, and sandbox, among others, to restrict content loading from unauthorized sources.
- Utilize CSP reporting mechanisms to monitor policy violations and fine-tune your CSP directives over time based on real-world usage and detected issues.

By implementing a robust Content Security Policy (CSP) and adhering to best practices for CSP configuration and management, you can significantly reduce the risk of XSS attacks, data injection vulnerabilities, and other web security threats, thereby enhancing the overall security posture of your application.

References:

1. Mozilla Developer Network: Introducing Content Security Policy
2. OWASP Content Security Policy Cheat Sheet
3. W3C Content Security Policy Specification

MCHSF - Missing Cookie HttpOnly and Secure Flags

Criticality	Minor / Informative
Status	Unresolved

Description

The `SERVERID` cookie is being set without the HttpOnly and Secure flags, exposing the application to security risks. The absence of the HttpOnly flag allows client-side JavaScript to access the cookie, increasing the likelihood of sensitive cookie information being stolen via cross-site scripting (XSS) attacks. The absence of the Secure flag allows the cookie to be transmitted over unencrypted HTTP connections, which could result in its interception by attackers during transit.

If this cookie is used for session management or contains sensitive information, these vulnerabilities can lead to session hijacking, user account compromise, or data exposure.

The issue was observed in responses from the following URLs:

1. https://runonflux.com
2. https://runonflux.com/
3. https://runonflux.com/sitemap.xml

Recommendation

To mitigate these risks, the team is advised to configure the affected cookie with both the HttpOnly and Secure flags. Specifically, the team could:

1. Review the application's cookie settings to ensure all cookies, especially those used for session management or containing sensitive data, are configured with the HttpOnly flag. This prevents client-side scripts from accessing the cookie.
2. Ensure all cookies are transmitted only over encrypted HTTPS connections by enabling the Secure flag.
3. After implementing these changes, test the application to confirm that the cookies are correctly flagged and functionality remains intact.

By enforcing both the HttpOnly and Secure flags, the application can reduce the risk of session hijacking, data theft, and unauthorized access, thereby improving overall security.

Reference: OWASP: HttpOnly Cookies

Reference: OWASP: HttpOnly Cookies

MSTSH - Missing Strict Transport Security Header

Criticality	Minor / Informative
Status	Unresolved

Description

The absence of the HTTP Strict Transport Security (HSTS) header poses a security risk to the application. HSTS is a crucial web security mechanism that instructs compliant web browsers to interact with the server using only secure HTTPS connections, thereby enhancing the overall security of communication between the client and the server. By enforcing HTTPS usage, HSTS helps mitigate various security threats, including man-in-the-middle attacks, network eavesdropping, and protocol downgrade attacks.

The following URLs is a sample of all the occurrences where a HTTP Strict Transport Security (HSTS) header was not set.

1. https://runonflux.com
2. https://runonflux.com/
3. https://runonflux.com/favicon.ico
4. https://runonflux.com/fluxAI
5. https://runonflux.com/images/Background%20Cost%20Calculator.svg
6. https://runonflux.com/images/close-icon.svg
7. https://runonflux.com/robots.txt
8. https://runonflux.com/sitemap.xml

Recommendation

To enhance the security of the application and enforce secure communication over HTTPS, it is essential to ensure that the web server, application server, load balancer, or any other relevant components are configured to enforce Strict Transport Security (HSTS). By configuring the application to enforce Strict Transport Security (HSTS) and following best practices for HSTS implementation, the application can significantly reduce the risk of network-based attacks, protect sensitive data in transit, and enhance overall security posture.

References:

1. https://cheatsheetseries.owasp.org/cheatsheets/HTTP_Strict_Transport_Security_Cheat_Sheet.html
2. https://owasp.org/www-community/Security_Headers
3. http://en.wikipedia.org/wiki/HTTP_Strict_Transport_Security

MXH - Missing X-Content-Type-Options Header

Criticality	Minor / Informative
Status	Unresolved

Description

The absence of the X-Content-Type-Options header exposes the application to potential MIME-sniffing attacks, particularly affecting older versions of Internet Explorer and Chrome. This vulnerability allows browsers to interpret response bodies as content types other than the declared type, potentially leading to security breaches and data exposure. Even error pages (e.g., 401, 403, 500) remain susceptible to such attacks, necessitating immediate action to safeguard against injection vulnerabilities.

The following URLs is a sample of all the occurrences where a X-Content-Type-Options header was not set.

1. https://runonflux.com
2. https://runonflux.com/
3. https://runonflux.com/favicon.ico
4. https://runonflux.com/images/Background%20Cost%20Calculator.svg
5. https://runonflux.com/images/close-icon.svg

Recommendation

To mitigate this risk, the team is advised to ensure that the application or web server configures the Content-Type header accurately and includes the X-Content-Type-Options header set to 'nosniff' for all web pages. Additionally, consider recommending users employ modern, standards-compliant web browsers that either abstain from MIME-sniffing or allow for its suppression via directives from the server or application.

Reference:

https://learn.microsoft.com/en-us/previous-versions/windows/internet-explorer/ie-developer/compatibility/gg622941(v=vs.85) https://owasp.org/www-community/Security_Headers

SIUL - Server Instability Under Load

Criticality	Minor / Informative
Status	Unresolved

Description

The web app highlighted a concerning number of errors (3,085), out of which 3,073 were timeouts during the assessment period, indicating potential challenges with server stability and resource allocation. Such issues can significantly impact user experience and necessitate a deeper investigation into server health and capacity planning.

In summary:

- The conducted test used 3000 concurrent connections in 30 seconds timespan.
- The number of requests that were sent was 37,574 requests in 30.94 seconds.
- The number of connection errors (including timeouts) that occurred were 3,085.
- The number of connection timeouts that occurred were 3,073.

Recommendation

To mitigate these challenges, it is advised to conduct a comprehensive analysis of server logs and infrastructure to pinpoint the underlying causes of errors and timeouts. This analysis should inform the optimization of server configurations, potential resource upgrades, and the implementation of robust error handling mechanisms. By addressing these areas, disruptions to user access can be minimized, ensuring a smoother and more reliable service experience.

Summary

This report provides a thorough assessment of the web application's security and performance. Through meticulous analysis, the report identifies vulnerabilities and weaknesses in key areas such as data handling and network security. Recommendations are provided to address these issues and enhance the application's resilience against cyber threats.

Overall, the report serves as a valuable resource, offering insights into the application's security posture and actionable recommendations to fortify its defenses. By implementing the suggested measures, the team can strengthen the app's security foundation and maintain trust among users.

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Cyberscope is a blockchain cybersecurity company that was founded with the vision to make web3.0 a safer place for investors and developers. Since its launch, it has worked with thousands of projects and is estimated to have secured tens of millions of investors' funds.

Cyberscope is one of the leading smart contract audit firms in the crypto space and has built a high-profile network of clients and partners.

The Cyberscope team

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