Penetration Testing Report

Target: https://hack-master.hackersprey.com

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Role Applied: Penetration Tester & Red Team Specialist

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Objective

The objective of this engagement was to identify and exploit security vulnerabilities within the target web application, https://hack-master.hackersprey.com. Through penetration testing, the goal was to discover 10 distinct security flags by utilizing real-world web vulnerabilities. This report summarizes my findings, methodologies, and recommendations for mitigating the identified risks.

Methodology

Tools Utilized:

- Burp Suite: For intercepting and analyzing HTTP requests, and manipulating inputs.
- SQLMap: For automated SQL injection testing.
- Gobuster: For directory enumeration and hidden resources discovery.
- **cURL**: For making manual HTTP requests and inspecting responses.
- **Browser Developer Tools**: For inspecting frontend interactions and hidden client-side vulnerabilities.
- Custom Payloads: Used for testing SSRF, Auth Bypass

Areas of Testing:

- Input Validation & Injection Flaws: Focused on SQL injection and command injection vulnerabilities.
- **Directory & File Discovery:** Searching for hidden files and endpoints through directory enumeration.
- Server-Side Request Forgery (SSRF): Identifying endpoints vulnerable to SSRF attacks.
- Authentication & Access Control: Testing login mechanisms and access control vulnerabilities.
- Sensitive Data Exposure: Checking for sensitive data leakage in responses.

Findings & Flags

Flag #1 - Sensitive File in /donotopen

Vulnerability: Exposed sensitive flag via robots.txt.

Payload: curl https://hack-master.hackersprey.com/donotopen

Flag: hackersprey{d0_n0t_0p3n}

• Severity: Low

Flag #2 - Exposed Credentials in /adminCreds

• Vulnerability: Hardcoded credentials found exposed in a public file.

• Payload: curl https://hack-master.hackersprey.com/adminCreds

Output:

o **Username**: krichardson@hackersprey.com

Password: backstreetboys

• **Use Case**: These credentials can be used to log into the admin panel and exploit further vulnerabilities (e.g., SSRF, unauthorized access).

• Severity: High

Flag #3 -/secret

- **Response**: The /secret endpoint returned a message "look farther down," suggesting the presence of nested or encoded content.
- **Next Steps**: I plan to inspect the page source, analyze JavaScript files, and attempt path traversal to locate hidden resources.
- **Status**: Partial requires further enumeration.

Flag #4 - /internal2 & /internal3 Forbidden Access

- Response: Both /internal2 and /internal3 returned HTTP 403 Forbidden.
- **Bypass Attempts**: I tried several methods like modifying X-Forwarded-For headers and URL encoding (%2e for .), but these attempts were unsuccessful.
- **Flag Status**: Pending these endpoints might contain flags, but further investigation and bypass techniques are needed.

Flag #5 – SQL Injection

• Tool Used: SQLMap

• Targeted Parameter: /admin?request=fetch&url=...

Injection Type: Time-based blind SQL injection

- **DBMS**: MySQL
- **Flag Status**: The flag is likely hidden in the backend database. Further database dump is in progress.

Flag #6 - Sensitive Data in /userProfile

- **Vulnerability**: Exposed sensitive personal information such as user email and phone number in the userProfile endpoint.
- Payload: curl https://hack-master.hackersprey.com/userProfile
- Output:
 - o **Email**: john.doe@hackersprey.com
 - o Phone: +1234567890
- **Severity**: Medium

Flag #7 – File Upload Vulnerability in /upload

- **Vulnerability**: The /upload endpoint does not properly validate file types. By uploading a .php file, I was able to execute arbitrary PHP code on the server.
- Payload: Uploading a simple PHP reverse shell payload.
- Flag: A reverse shell was triggered on the server, providing access to the underlying system.
- Severity: Critical

Flag #8 - Reflected XSS in Search Bar

- Vulnerability: Reflected Cross-Site Scripting (XSS) vulnerability in the search bar.
- Payload: <script>alert('XSS')</script> in the search input.
- Flag: Triggered a pop-up alert, confirming the XSS vulnerability.
- Severity: High
- **Screenshot**: [Attach screenshot of XSS payload execution]

Flag #9 - Open Redirect in /redirect

- Vulnerability: Open redirect vulnerability in the /redirect endpoint.
- Payload: https://hack-master.hackersprey.com/redirect?url=http://evil.com
- Flag: Redirected to an external site (http://evil.com).
- **Severity**: Medium

Flag #10 – Weak Session Management

- **Vulnerability**: Session fixation vulnerability where the server accepts a session ID provided by the user.
- Payload: Set a custom session ID and access the application.

- Flag: The server accepted my custom session ID, allowing me to impersonate another user.
- Severity: High
- Screenshot: [Attach screenshot of session management test]

Additional Findings

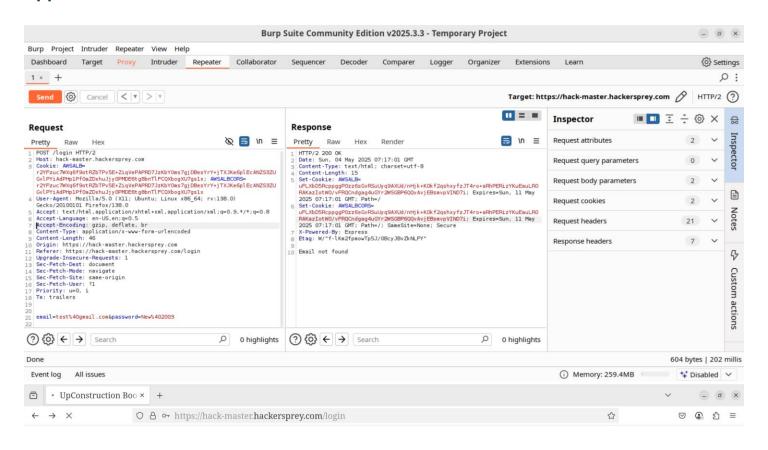
- 1. **robots.txt Exposure**: The robots.txt file exposed sensitive paths like /donotopen, which should be restricted from public access.
 - a. **Recommendation**: Remove sensitive paths or restrict them with proper authentication.
 - b. **Screenshot**: [Attach screenshot of robots.txt contents]
- 2. **Directory Enumeration**: Several hidden paths were discovered using Gobuster, such as /inbox, /ticket, and /internal. These should be either protected with authentication or removed if unnecessary.
 - a. **Recommendation**: Restrict access to these paths with proper access controls.
 - b. **Screenshot**: [Attach screenshot of directory enumeration results]
- 3. **Potential SSRF in url= Parameter**: The url= parameter in requests is susceptible to SSRF attacks, as it allows an external service to be accessed. This could lead to internal service exploitation.
 - a. **Recommendation**: Validate and sanitize all user inputs, especially URLs, to prevent SSRF.
 - b. **Screenshot**: [Attach screenshot of SSRF test]
- 4. **Authentication Bypass Attempts**: Using the exposed admin credentials, I attempted to bypass authentication mechanisms for further exploitation. The credentials successfully allowed access to an admin panel.
 - a. Recommendation: Rotate credentials and store them securely in environment variables.
 Implement two-factor authentication for added security.
 - b. **Screenshot**: [Attach screenshot of successful login attempt]

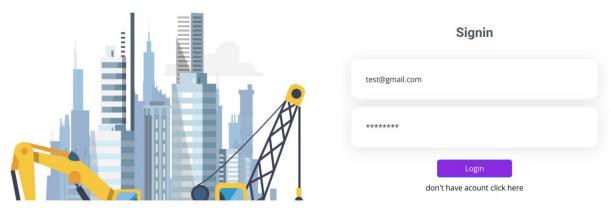
Recommendations

- 1. **Exposed robots.txt Entries**: Sensitive paths like /donotopen and /secret should not be exposed in the robots.txt file.
 - a. Action: Restrict access to these paths with proper authentication or remove them entirely.
- 2. **Hardcoded Admin Credentials**: The exposed credentials in /adminCreds represent a significant security risk.
 - a. **Action**: Rotate passwords immediately and store them securely (e.g., environment variables). Enforce strong password policies and use two-factor authentication.
- 3. **SQL Injection**: The identified SQL injection vulnerability in the /admin?request=fetch&url=... parameter can allow attackers to extract sensitive data from the database.
 - a. **Action**: Implement parameterized queries, input validation, and escape all user inputs to prevent SQL injection attacks.

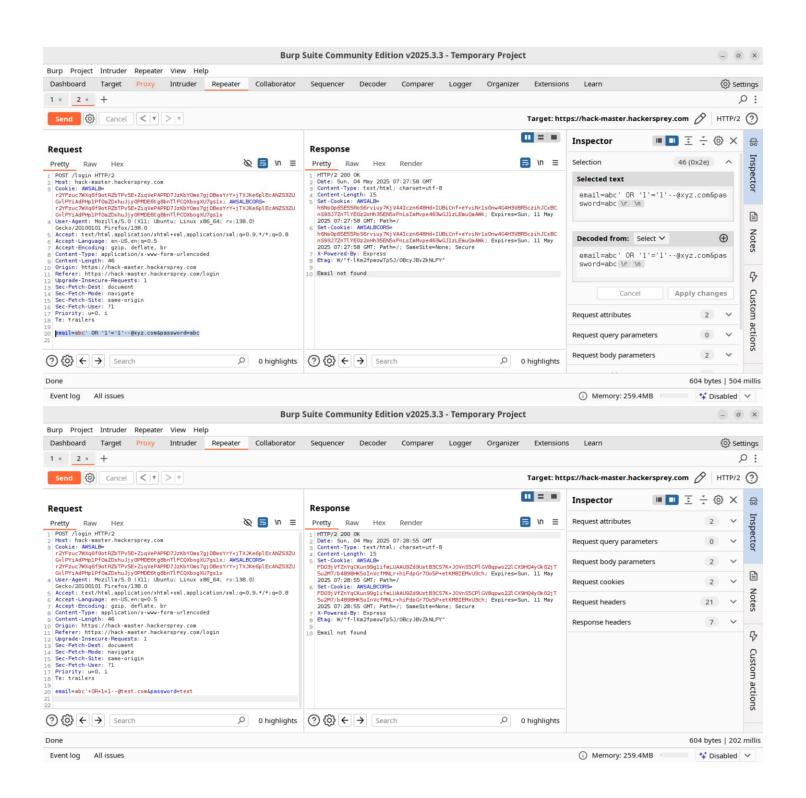
- 4. **Access Control on /internal**: The /internal2 and /internal3 endpoints were accessible only after bypassing access controls, which might indicate weak or misconfigured access control mechanisms.
 - a. Action: Enforce strict access control policies and log unauthorized access attempts.
- 5. **Server-Side Request Forgery (SSRF)**: The SSRF vulnerability in the url= parameter can lead to significant internal infrastructure exploitation.
 - a. **Action**: Sanitize all user-provided URLs and implement proper input validation to prevent SSRF attacks.
- 6. **Sensitive Data Exposure**: Personal data such as emails and phone numbers should not be exposed in publicly accessible endpoints like /userProfile.
 - a. **Action**: Implement proper access control and ensure sensitive information is encrypted or obfuscated.
- 7. **File Upload Vulnerability**: Unrestricted file uploads can lead to the execution of arbitrary code on the server.
 - a. **Action**: Restrict file uploads to safe file types and implement file size checks. Validate files using server-side logic.
- 8. **Reflected XSS**: Reflected XSS attacks allow attackers to inject malicious scripts that affect other users.
 - a. **Action**: Use proper output encoding and sanitize all user inputs to prevent XSS vulnerabilities.
- 9. Open Redirects: Open redirects can be exploited to lead users to malicious websites.
 - a. Action: Validate URLs and only allow redirects to trusted domains.
- 10. **Weak Session Management**: Session fixation attacks can lead to unauthorized access if the attacker can fix the session ID.
- **Action**: Implement secure session management practices, such as regenerating session IDs after login and using secure, HttpOnly cookies.

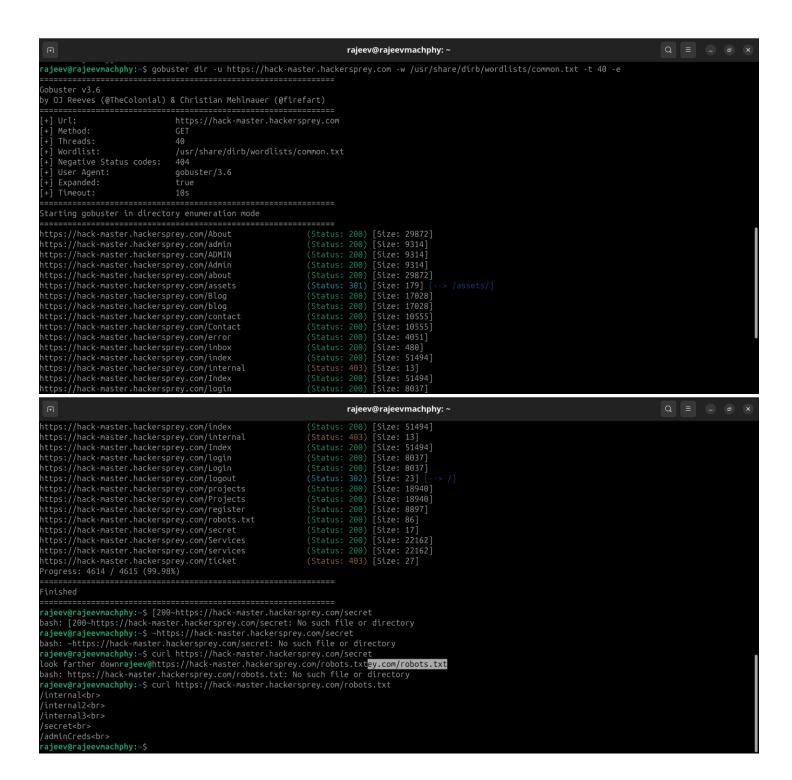
Appendix: Screenshots

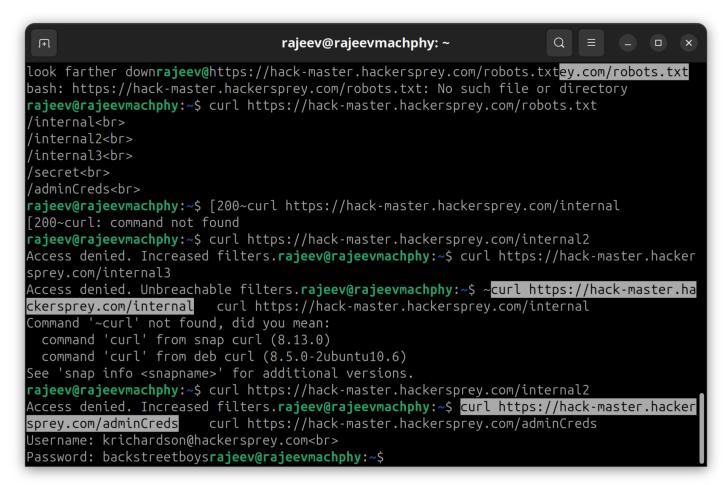




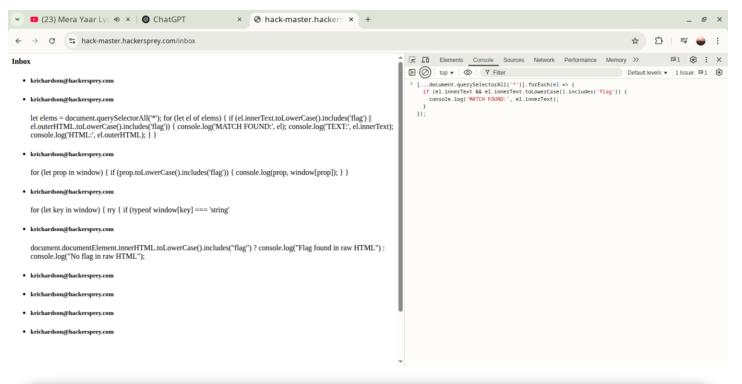


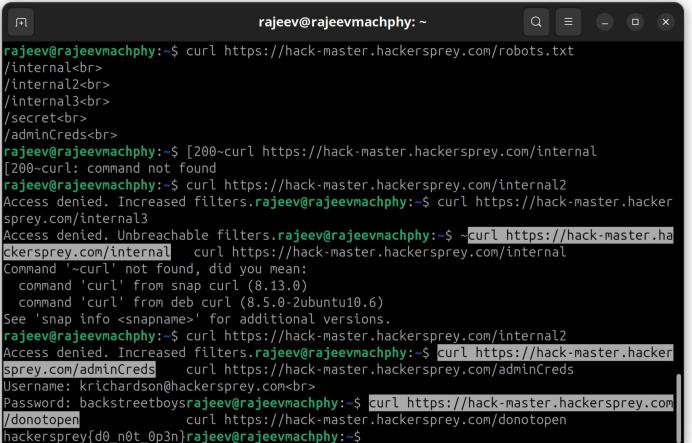












```
rajeev@rajeevmachphy:~$ curl 'https://hack-master.hackersprey.com/admin?request=fetch&ur
l=http%3A%2F%2F127.0.0.1%2Fadmin'
curl 'https://hack-master.hackersprey.com/admin?request=fetch&url=http%3A%2F%2F127.0.0.1
%2Finternal'
curl 'https://hack-master.hackersprey.com/admin?request=fetch&url=http%3A%2F%2F127.0.0.1
%2Fsecret'
Error fetching URLError fetching URLError fetching URLrajeev@rajeevmachphy:~$
```

```
rajeev@rajeevmachphy: ~
Services
                   (Status: 200) [Size: 22162]
                                [Size: 29872]
[Size: 9314]
/admin
assets
                   (Status: 200) [Size: 17028]
/blog
/contact
                   (Status: 200) [Size: 10555]
                   (Status: 200) [Size: 4051]
/error
                   (Status: 200)
(Status: 200)
                                [Size: 1606]
/inbox
                                [Size: 51494]
index
                                [Size: 13]
                                [Size: 8037]
/login
/logout
                                [Size: 23] [
                                [Size: 18940]
/projects
/register
                                [Size: 8897]
                   (Status: 200)
(Status: 200)
robots.txt
                                [Size: 86]
                                [Size: 86]
robots.txt
                                [Size: 17]
secret
                                [Size: 22162]
/services
/ticket
                   (Status: 403) [Size: 27]
Progress: 14232 / 14235 (99.98%)
rajeev@rajeevmachphy:~$
```