Penetration Testing Report for Pied Piper

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Description

This document details the process and result of a penetration test performed by Allsafe Cybersecurity from October 1, 2021 to November 1, 2021.

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Confidentiality Statement

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Pied Piper may share this document with auditors under non-disclosure agreements (NDAs) in order to demonstrate compliance with penetration test requirements.

Disclaimer

Penetration Testing is considered as a snapshot in time. The technical findings and general recommendations are based on the information gathered during the penetration testing and do not include any changes or modifications made outside of the time frame.

Contact Information

The following are the point of contact (POC) of respective teams.

Full name	Title	Contact Information
Pied Piper		
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Allsafe Cybersecurity		
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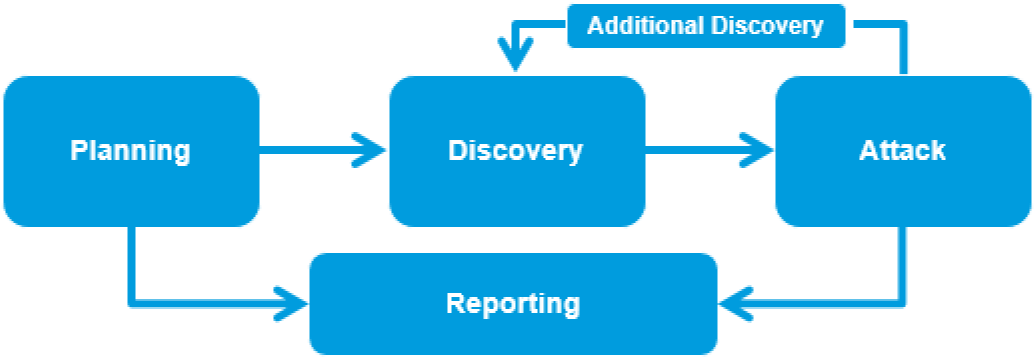
Severity Ratings

The following table defines levels of severity and corresponding CVSS score range that are used throughout the document to assess vulnerability and risk impact.

Severity	CVSS 3.1 Score Range	Definition
Critical	9.0 - 10.0	Exploitation is straightforward and usually results in system-level compromise. It is advised to form a plan of action and patch immediately.
High	7.0 - 8.9	Exploitation is more difficult but could cause elevated privileges and potentially a loss of data or downtime. It is advised to form a plan of action and patch as soon as possible
Moderate	4.0 - 6.9	Vulnerabilities exist but are not exploitable or require extra steps such as social engineering. It is advised to form a plan of action and patch after high-priority issues have been resolved.
Low	0.1 - 3.9	Vulnerabilities are non-exploitable but would reduce an organization's attack surface. It is advised to form a plan of action and patch during the next maintenance window.
None	0	No vulnerability exists. Additional information is provided regarding items noticed during testing, strong controls, and additional documentation.

Penetration Testing Methodology

Allsafe Cybersecurity followed the NIST SP 800-115 Technical Guide to Information Security Testing and Assessment. *(Note that the methodology really depends on your team)*



Phases of penetration testing activities include the following:

- Planning - Customer goals are gathered and rules of engagement obtained.
- Discovery - Perform scanning and enumeration to identify potential vulnerabilities, weak areas, and exploits.
- Attack - Confirm potential vulnerabilities through exploitation and perform additional discovery upon new access.
- Reporting - Document all found vulnerabilities and exploits.

Scope

Asset Type	Details
Website Application	https://piedpiper.com
API	https://api.piedpiper.com

Scope Exclusions

As per client request, Allsafe Cybersecurity did not perform any of the following attacks during testing:

- Denial of Service (DoS) attacks against production infrastructure
- Phishing / Social Engineering attacks

Executive Summary

Pied Piper engaged with Allsafe Cybersecurity to conduct an extensive penetration testing from October 1, 2021 to November 1, 2021 in order to determine its exposure to a targeted attack. All activities were conducted in a manner that simulated an external user or malicious actor.

The following are the goals of the penetration test as request by Pied Piper are:

- Identify if an external user or malicious actor could penetrate Pied Piper's defenses.
- Determine if there are any information exposure
- Assess the current security posture of the website application

All the testing performed is based on the OWASP Web Security Testing Guide (v4.1) with prioritization to OWASP's Top 10 Web Application Security Risks and API Security Top 10 2019.

Allsafe Cybersecurity team discovered 1 vulnerability that had a CVSS score of 7.0 or higher, rangking either high or critical. These security vulnerabilities should be prioritized by Pied Piper for fixing as it represents the greatest immediate risk to Pied Piper.

The following tables illustrate the vulnerabilities found by severity per asset.

Asset	**None**	**Low**	**Medium**	**High**	**Critical**	**Total**
https://piedpiper.com	0	0	0	0	0	0
https://api.piedpiper.com	0	0	0	0	1	1

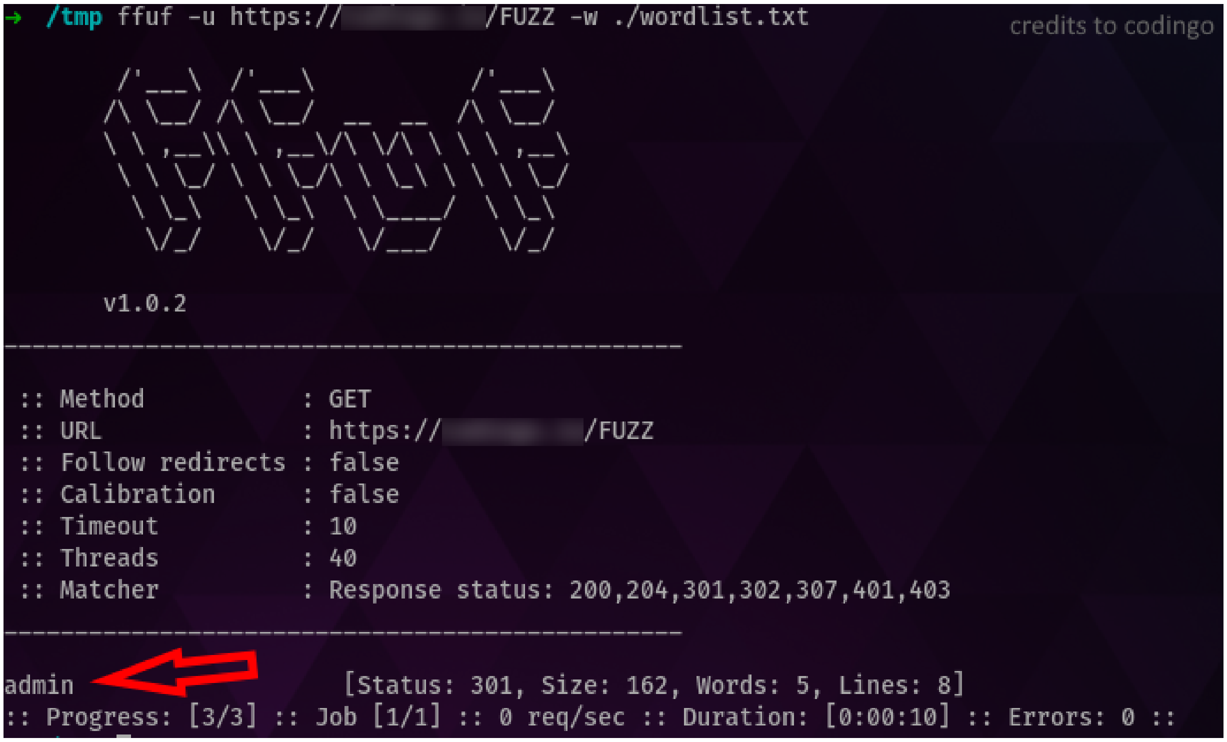
Technical Findings

Improper Restriction of Excessive Authentication Attempts in /admin (Critical)

Severity	Critical (9.8) - CVSS:3.1/AV:N/AC:L/PR:N/UI:N/S:U/C:H/I:H/A:H
Affected Scope	https://api.piedpiper.com/admin
Weakness Type	CWE-307
Tools Used	Ffuf and BurpSuite Intruder

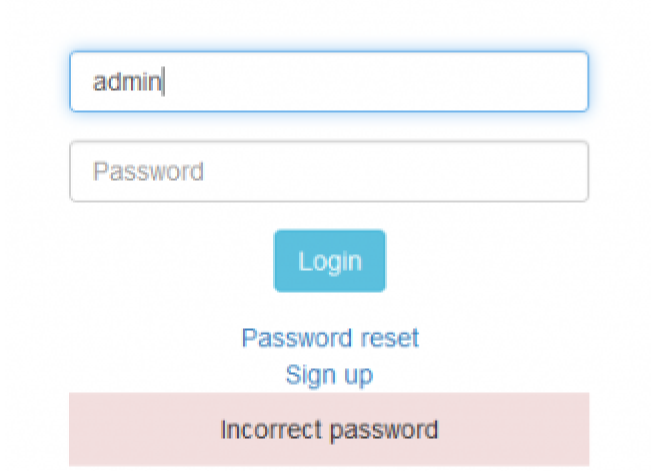
Details
PiedPiper's admin panel is accessible publicly to any user. This panel does not have any rate limit or account lockout protection to prevent brute force attacks.

Proof of Concept
We initially performed directory enumeration to identify accessible pages or directories on the website application. Screenshot below shows that tool discovered an accessible admin panel.



```
→ /tmp ffuf -u https://[redacted]/FUZZ -w ./wordlist.txt

        /'___\  /'___\           /'___\
       /\ \__/ /\ \__/  __  __  /\ \__/
       \ \ ,__\\ \ ,__\/\ \/\ \ \ \ ,__\
        \ \ \_/ \ \ \_/\ \ \_\ \ \ \ \_/
         \ \_\   \ \_\  \ \____/  \ \_\
          \/_/    \/_/   \/___/    \/_/

       v1.0.2
________________________________________________

 :: Method           : GET
 :: URL              : https://[redacted]/FUZZ
 :: Follow redirects : false
 :: Calibration      : false
 :: Timeout          : 10
 :: Threads          : 40
 :: Matcher          : Response status: 200,204,301,302,307,401,403
________________________________________________

admin                   [Status: 301, Size: 162, Words: 5, Lines: 8]
:: Progress: [3/3] :: Job [1/1] :: 0 req/sec :: Duration: [0:00:10] :: Errors: 0 ::
```

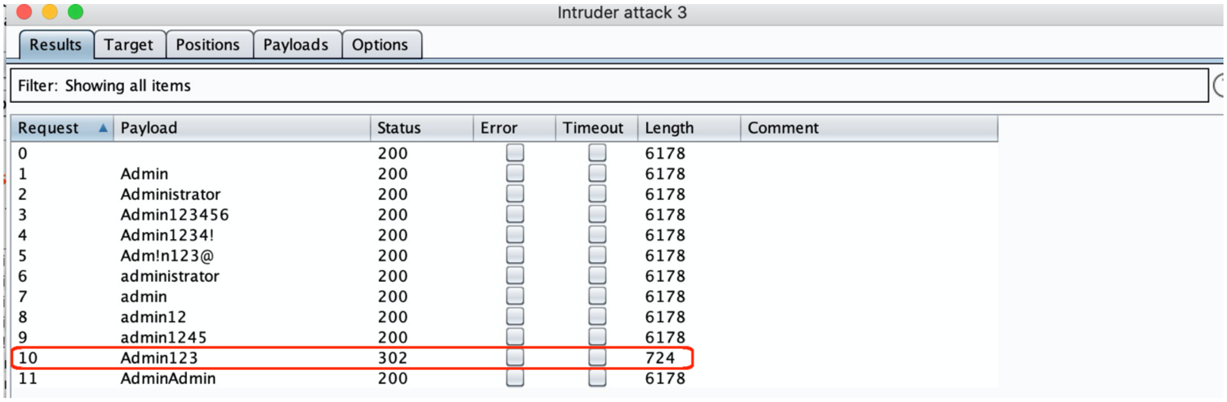
Upon accessing the admin panel, we noticed that Pied Piper uses ‘admin’ as a username after performing fingerprinting.



admin

Incorrect password

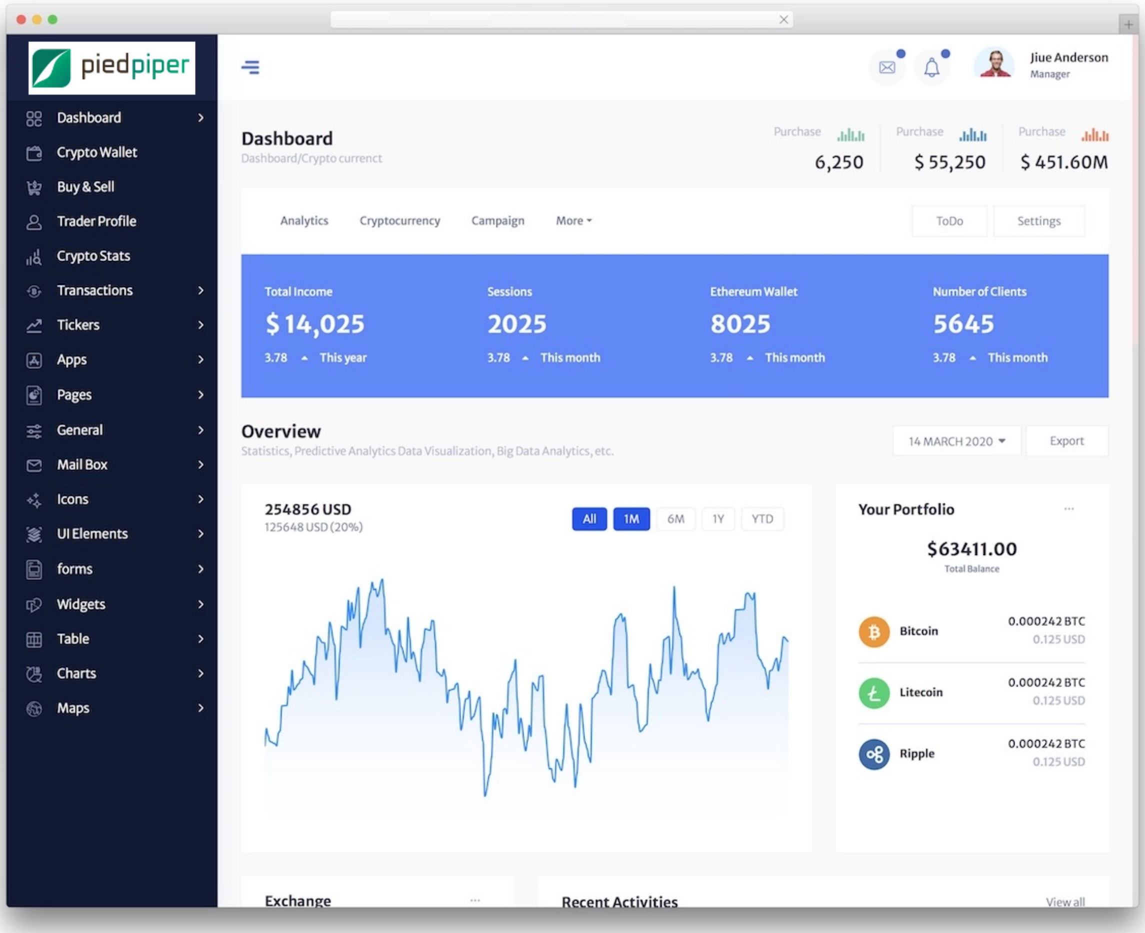
We then fired up BurpSuite to brute force the login form using the Intruder tool. After a few seconds, we already found the password.



Filter: Showing all items

Request ▲	Payload	Status	Error	Timeout	Length	Comment
0		200	☐	☐	6178	
1	Admin	200	☐	☐	6178	
2	Administrator	200	☐	☐	6178	
3	Admin123456	200	☐	☐	6178	
4	Admin1234!	200	☐	☐	6178	
5	Adm!n123@	200	☐	☐	6178	
6	administrator	200	☐	☐	6178	
7	admin	200	☐	☐	6178	
8	admin12	200	☐	☐	6178	
9	admin1245	200	☐	☐	6178	
10	Admin123	302	☐	☐	724	
11	AdminAdmin	200	☐	☐	6178	

The Admin credential is the following:
Username: admin
Password: Admin123



Impact

This could allow attackers to compromise the admin account by performing a simple brute force attack.

Recommendation

1. Have a security policy that will require employees to come up with a strong password by following the password requirement set forth by the company.
2. Do not allow users to use ‘admin’ username.
3. Implement account lockout to prevent attackers from continuously performing brute-force attack and/or password spraying.
4. If possible, implement and enforce Two-Factor Authentication (2FA) to prevent full access to the account.

References

- https://cwe.mitre.org/data/definitions/307.html

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