

Pen-Testing a Payment Provider

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Motivation

Problem Statement

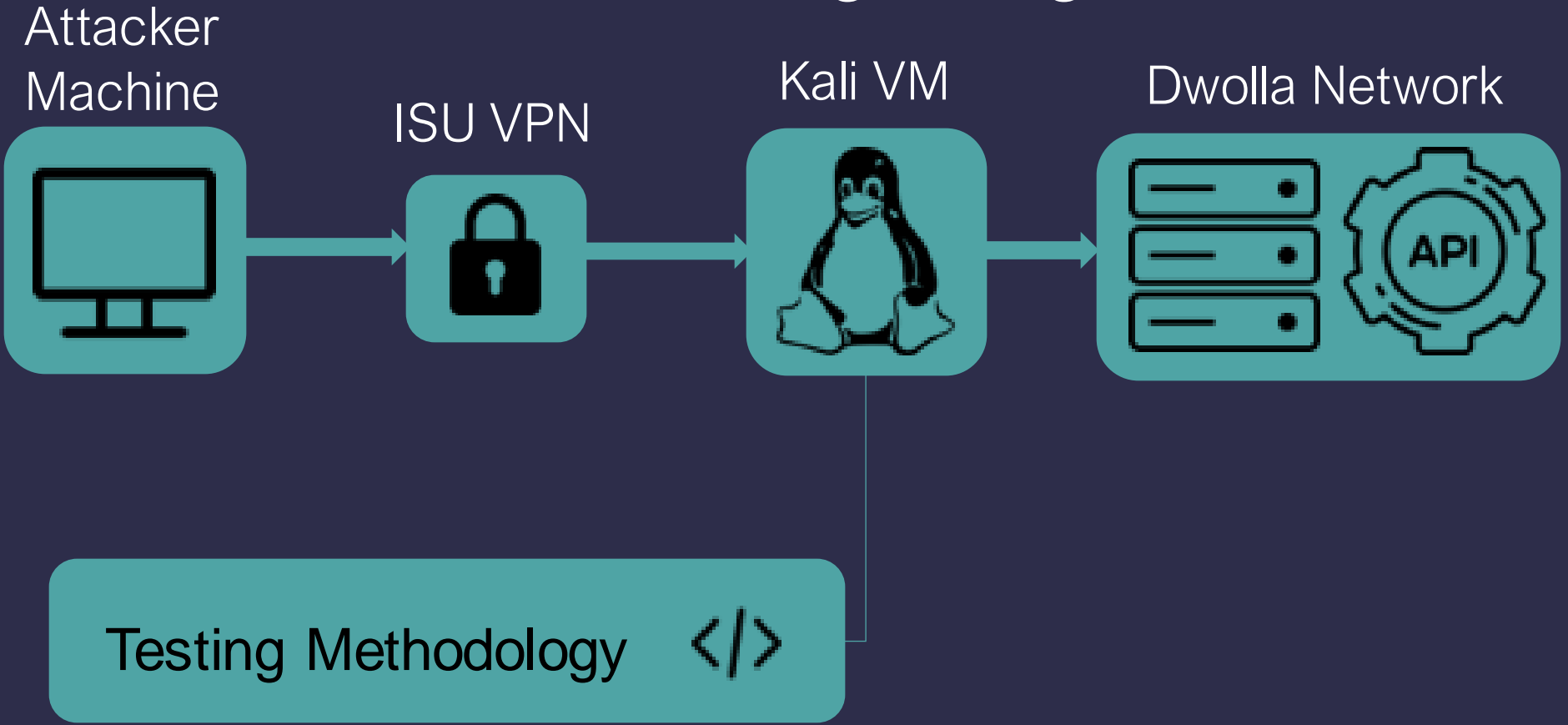
Dwolla, a payment systems provider, has requested a red team penetration test of their Sandbox web applications, as well as their publicly available API.

Solution

- Execute a penetration test against requested environments.
- Develop methodology for testing within the defined scope and rules of engagement.
- Report vulnerabilities found with a ranking of vulnerabilities based on risk to Dwolla’s systems.

Conceptual Designs

External Testing Design



Relevant Standards

- OWASP Foundation. “API Security Top 10 2019.”
- OWASP Foundation. “Web Application Security Top 10 2019.”
- National Institute of Standards and Technology “Technical Guide to Information Security Testing and Assessment.”
- PTES Team. "The Penetration Testing Execution Standard."

Main Deliverables

Executive Summary

- Give insight into vulnerabilities to non-technical staff
- Explain impact of vulnerabilities found from a business-oriented perspective
- Provide a problem-oriented solution guide

Technical Report

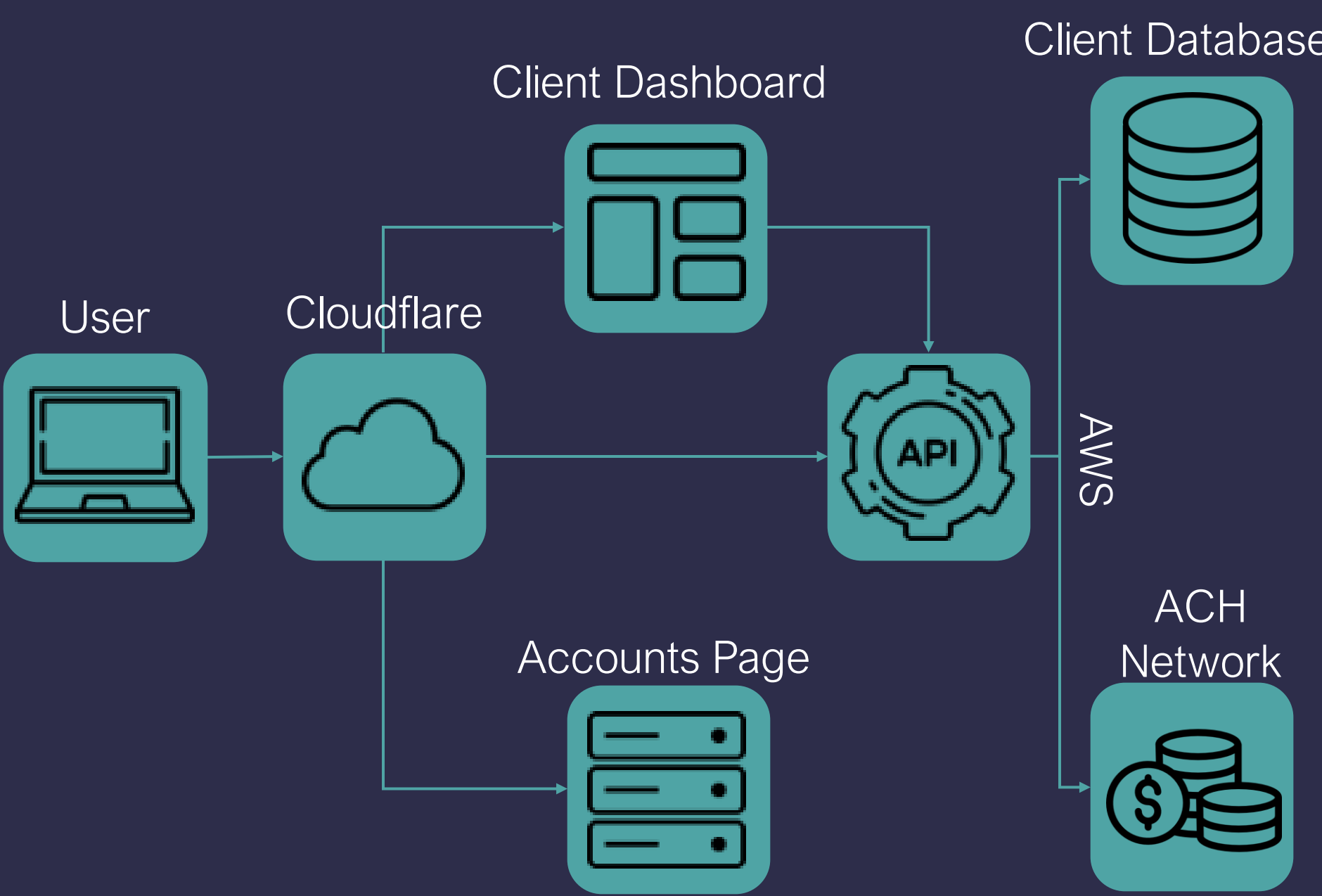
- Give in-depth technical explanation of vulnerabilities found
- Provide each vulnerability exploit path, risk rating, and remediation steps

Technical Details

Open-Source Tools Used

- | | |
|-------------------------------|--------------|
| – Kali Linux | – Dwolla SDK |
| – OWASP-Zap | – Postman |
| – BurpSuite Community Edition | – Firefox |
| | – Python |

Dwolla Network Design



Operational Requirements

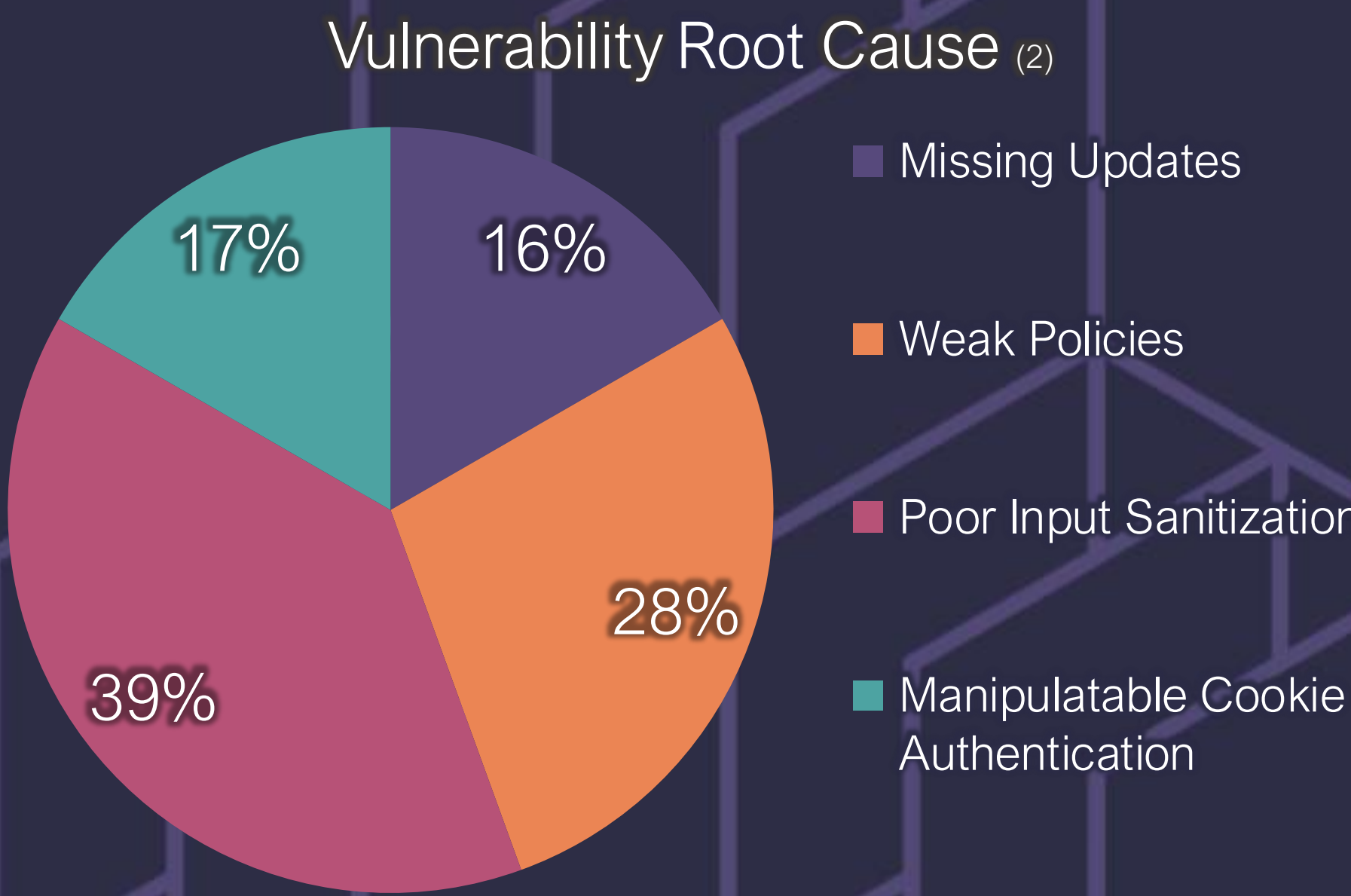
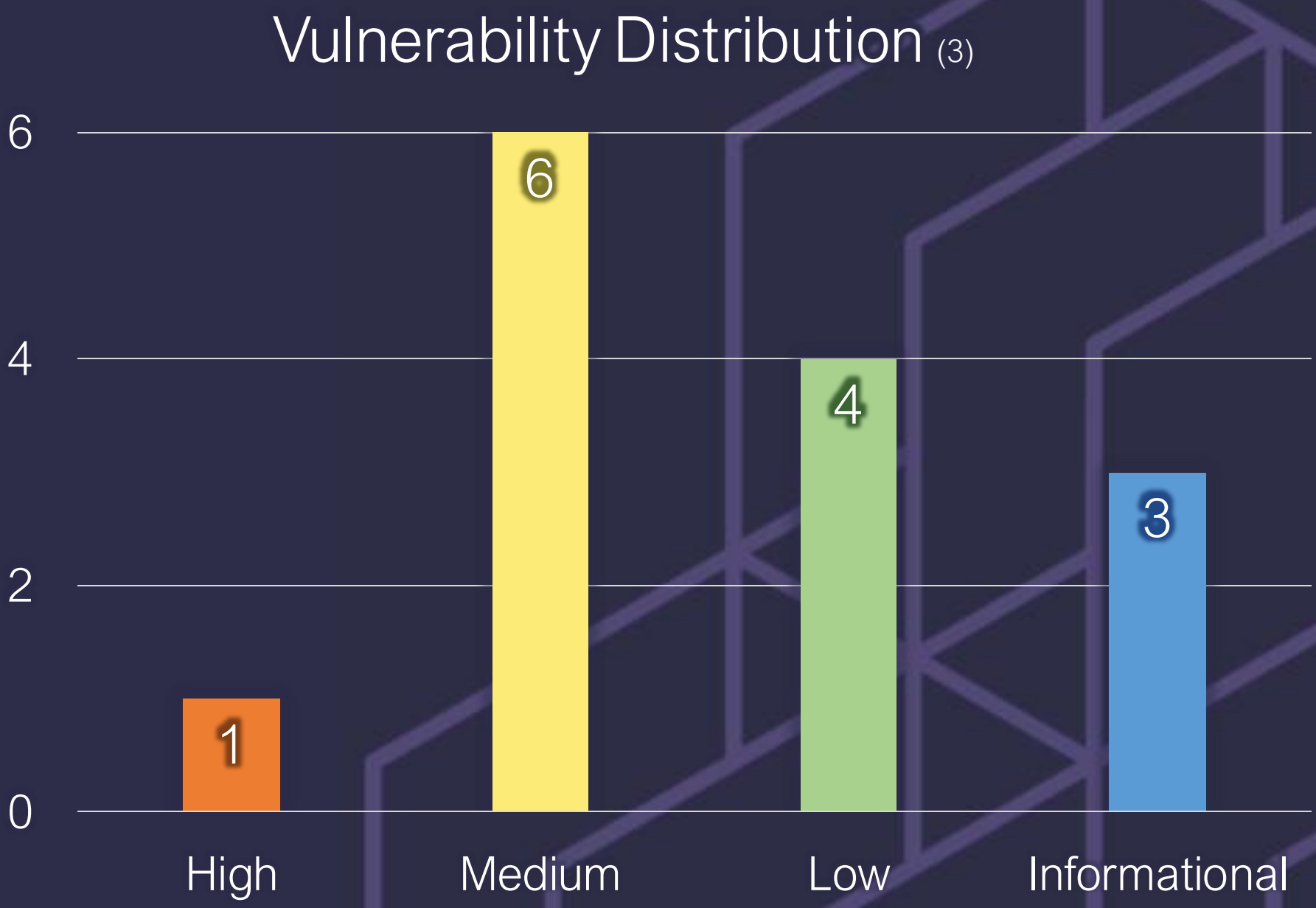
Scope

- Test only the sandbox dashboard and accounts page, and Dwolla API.
- Utilize Dwolla developed SDKs to interact with the Dwolla API.

Rules of Engagement

- Remain within scope
- Avoid stress testing through invasive attacks
- Protect Dwolla’s clients through upholding the integrity of the Dwolla API or sandbox environment
- Utilize only open-source tools and resources

Testing Results



Results Summary

- (1): Rank of vulnerabilities
 - (2): Distribution of found vulnerability root causes
 - (3): Number of vulnerabilities found in each rank
- * No critical vulnerabilities found