WexMaster Polygon

Smart Contract Audit Report
Prepared for Wault Finance

Date Issued:	Jun 13, 2021
Project ID:	AUDIT2021004
Version:	v1.0
Confidentiality Level:	Public

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Report Information

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Version	v1.0
Client	Wault Finance
Project	WexMaster Polygon
Auditor(s)	Weerawat Pawanawiwat Pongsakorn Sommalai Suvicha Buakhom
Author	Pongsakorn Sommalai
Reviewer	Weerawat Pawanawiwat
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Version History

Version	Date	Description	Author(s)
1.0	Jun 13, 2021	Full report	Pongsakorn Sommalai

Contact Information

Company	Inspex
Phone	(+66) 90 888 7186
Telegram	t.me/inspexco
Email	audit@inspex.co

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1. Executive Summary

As requested by Wault Finance, Inspex team conducted an audit to verify the security posture of the WexMaster Polygon smart contracts on Jun 12, 2021. During the audit, Inspex team examined all smart contracts and the overall operation within the scope to understand the overview of WexMaster Polygon smart contracts. Static code analysis, dynamic analysis, and manual review were done in conjunction to identify smart contract vulnerabilities together with technical & business logic flaws that may be exposed to the potential risk of the platform and the ecosystem. Practical recommendations are provided according to each vulnerability found, and should be followed to remediate the issue.

1.1. Audit Result

In the initial audit, Inspex found only 1 low-severity issue, and the issue was acknowledged by the Wault Finance team. Therefore, Inspex trusts that the WexMaster Polygon smart contract has sufficient protections to be safe for public use. However, in the long run, Inspex suggests resolving all issues found in this report.

1.2. Disclaimer

This security audit is not produced to supplant any other type of assessment and does not guarantee the discovery of all security vulnerabilities within the scope of the assessment. However, we warrant that this audit is conducted with goodwill, professional approach, and competence. Since an assessment from one single party cannot be confirmed to cover all possible issues within the smart contract(s), Inpex suggests conducting multiple independent assessments to minimize the risks. Lastly, nothing contained in this audit report should be considered as investment advice.

2. Project Overview

2.1. Project Introduction

WexMaster is a smart contract made to distribute Wault Finance platform's governance token. The users can stake predefined tokens into the pools to gain the governance token as a reward. The past version of this smart contract has been deployed on the Binance Smart Chain, and Wault Finance has resolved the issues found from the previous version in preparation for the deployment on Polygon.

Scope Information:

Project Name	WexMaster Polygon
Website	https://wault.finance/
Smart Contract Type	Ethereum Smart Contract
Programming Language	Solidity

Audit Information:

Audit Method	Whitebox
Audit Date	Jun 12, 2021

2.2. Scope

The following smart contracts were audited and reassessed by Inspex in detail:

Initial Audit:

Name	Location (URL)
WexMaster.sol	https://github.com/WaultFinance/WAULT/blob/b995392a67c7ffb5cbcd36297a11f9ac7c98ed41/contracts/WexMaster.sol

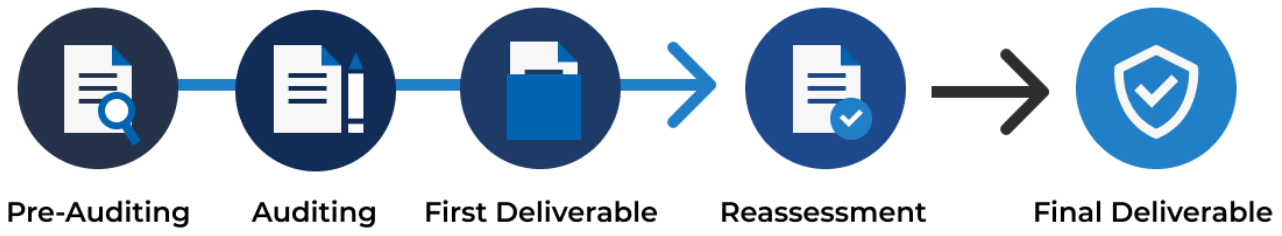
Reassessment:

There is no issue that needed the reassessment activity.

3. Methodology

Inspex conducts the following procedure to enhance the security level of our clients' smart contracts:

1. **Pre-Auditing**: Getting to understand the overall operations of the related smart contracts, checking for readiness, and preparing for the auditing
2. **Auditing**: Inspecting the smart contracts using automated analysis tools and manual analysis by a team of professionals
3. **First Deliverable and Consulting**: Delivering a preliminary report on the findings with suggestions on how to remediate those issues and providing consultation
4. **Reassessment**: Verifying the status of the issues and whether there are any other complications in the fixes applied
5. **Final Deliverable**: Providing a full report with the detailed status of each issue



3.1. Test Categories

Inspex smart contract auditing methodology consists of both automated testing with scanning tools and manual testing by experienced testers. We have categorized the tests into 3 categories as follows:

1. **General Smart Contract Vulnerability (General)** - Smart contracts are analyzed automatically using static code analysis tools for general smart contract coding bugs, which are then verified manually to remove all false positives generated.
2. **Advanced Smart Contract Vulnerability (Advanced)** - The workflow, logic, and the actual behavior of the smart contracts are manually analyzed in-depth to determine any flaws that can cause technical or business damage to the smart contracts or the users of the smart contracts.
3. **Smart Contract Best Practice (Best Practice)** - The code of smart contracts is then analyzed from the development perspective, providing suggestions to improve the overall code quality using standardized best practices.

3.2. Audit Items

The following audit items were checked during the auditing activity.

General
Reentrancy Attack
Integer Overflows and Underflows
Unchecked Return Values for Low-Level Calls
Bad Randomness
Transaction Ordering Dependence
Time Manipulation
Short Address Attack
Outdated Compiler Version
Use of Known Vulnerable Component
Deprecated Solidity Features
Use of Deprecated Component
Loop with High Gas Consumption
Unauthorized Self-destruct
Redundant Fallback Function
Advanced
Business Logic Flaw
Ownership Takeover
Broken Access Control
Broken Authentication
Upgradable Without Timelock
Improper Kill-Switch Mechanism
Improper Front-end Integration
Insecure Smart Contract Initiation

Denial of Service
Improper Oracle Usage
Memory Corruption
Best Practice
Use of Variadic Byte Array
Implicit Compiler Version
Implicit Visibility Level
Implicit Type Inference
Function Declaration Inconsistency
Token API Violation
Best Practices Violation

3.3. Risk Rating

OWASP Risk Rating Methodology[1] is used to determine the severity of each issue with the following criteria:

- **Likelihood**: a measure of how likely this vulnerability is to be uncovered and exploited by an attacker.
- **Impact**: a measure of the damage caused by a successful attack

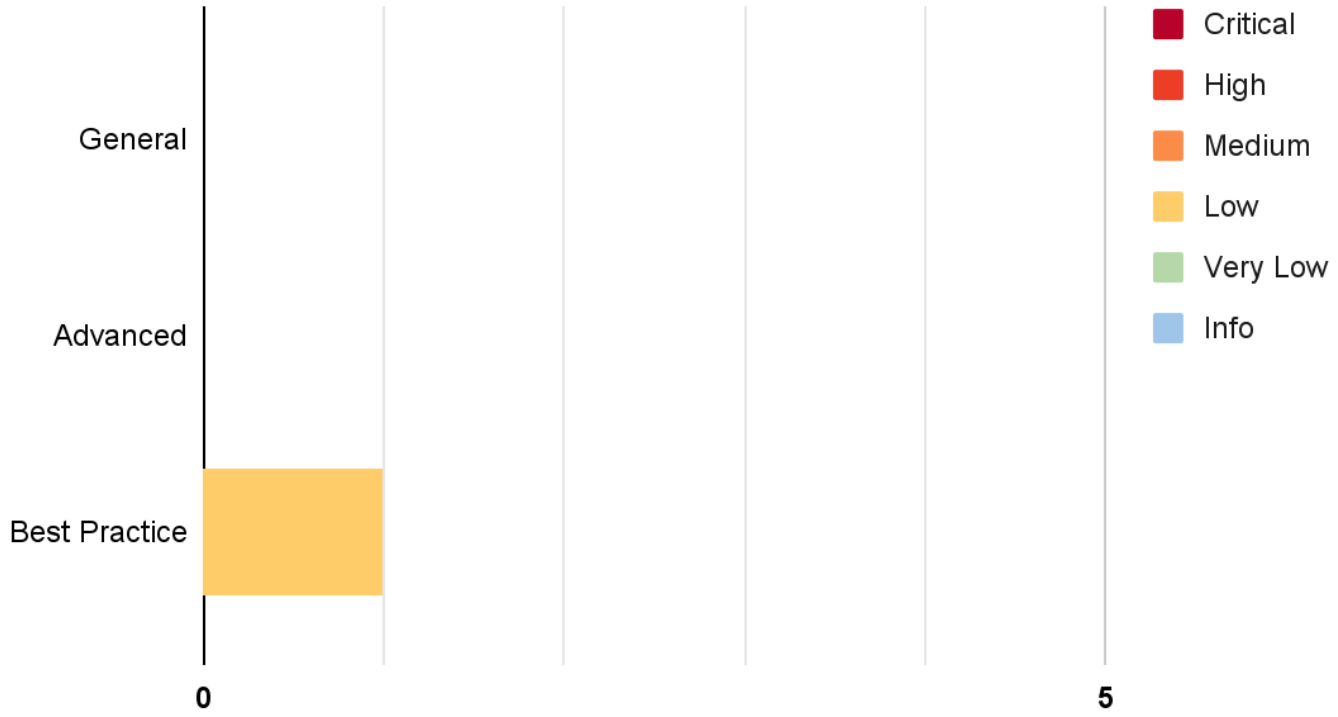
Both likelihood and impact can be categorized into three levels: **Low**, **Medium**, and **High**.

Severity is the overall risk of the issue. It can be categorized into five levels: **Very Low**, **Low**, **Medium**, **High**, and **Critical**. It is calculated from the combination of likelihood and impact factors using the matrix below. The severity of findings with no likelihood or impact would be categorized as **Info**.

Impact \ Likelihood	Low	Medium	High
Low	**Very Low**	**Low**	**Medium**
Medium	**Low**	**Medium**	**High**
High	**Medium**	**High**	**Critical**

4. Summary of Findings

From the assessments, Inspex has found 1 issue in three categories. The following chart shows the number of the issues categorized into three categories: **General**, **Advanced**, and **Best Practice**.



The statuses of the issues are defined as follows:

Status	Description
Resolved	The issue has been resolved and has no further complication.
Resolved *	The issue has been resolved with mitigations and clarifications. For the clarification or mitigation detail, please refer to Chapter 5.
Acknowledged	The issue's risk has been acknowledged and accepted.
No Security Impact	The best practice recommendation has been acknowledged.

The information and status of each issue can be found in the following table:

ID	Title	Category	Severity	Status
IDX-001	Improper Update of State Variable	General	Low	Acknowledged

5. Detailed Findings Information

5.1. Potential Centralized Control of State Variable

ID	IDX-001
Target	WexMaster.sol
Category	Smart Contract Best Practice
CWE	CWE-710: Improper Adherence to Coding Standards
Risk	**Severity:** Low **Impact:** Medium The controlling authorities can change the critical state variables to gain additional profit. Thus, it is unfair to the other users. **Likelihood:** Low There is nothing to restrict the changes from being done; however, the changes are limited by fixed values in the smart contracts.
Status	**Acknowledged** The issue's risk has been acknowledged and accepted.

5.1.1. Description

Critical state variables can be updated any time by the controlling authorities. Changes in these variables can cause impacts to the users, so the users should accept or be notified before these changes are effective.

However, there is currently no constraint to prevent the authorities from modifying these variables without notifying the users.

The controllable privileged state update functions are as follows:

Targets	Function	Modifier
WexMaster.sol (L:1297)	add()	onlyOwner
WexMaster.sol (L:1318)	remove()	onlyOwner
WexMaster.sol (L:1328)	set()	onlyOwner
WexMaster.sol (L:1481)	setWexPerBlock()	onlyOwner

5.1.2. Recommendation

In the ideal case, the critical state variables should not be modifiable to keep the integrity of the smart contract. However, if modifications are needed, Inspex suggests limiting the use of these functions via the following options:

- Implementing a community-run governance to control the use of these functions
- Using a Timelock contract to delay the changes for a reasonable amount of time

6. Appendix

6.1. About Inspex

Inspex is formed by a team of cybersecurity experts highly experienced in various fields of cybersecurity. We provide blockchain and smart contract professional services at the highest quality to enhance the security of our clients and the overall blockchain ecosystem.

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6.2. References

[1] “OWASP Risk Rating Methodology.” [Online]. Available: https://owasp.org/www-community/OWASP_Risk_Rating_Methodology. [Accessed: 08-May-2021]

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