BEOSIN
Blockchain Security

Portal

Smart Contract Security Audit

V1.0
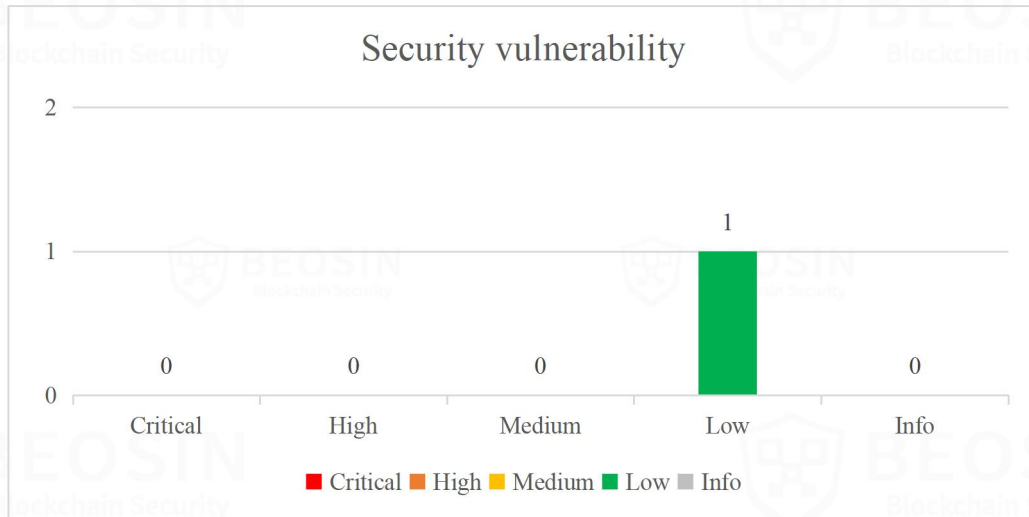
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Mar 21th, 2023
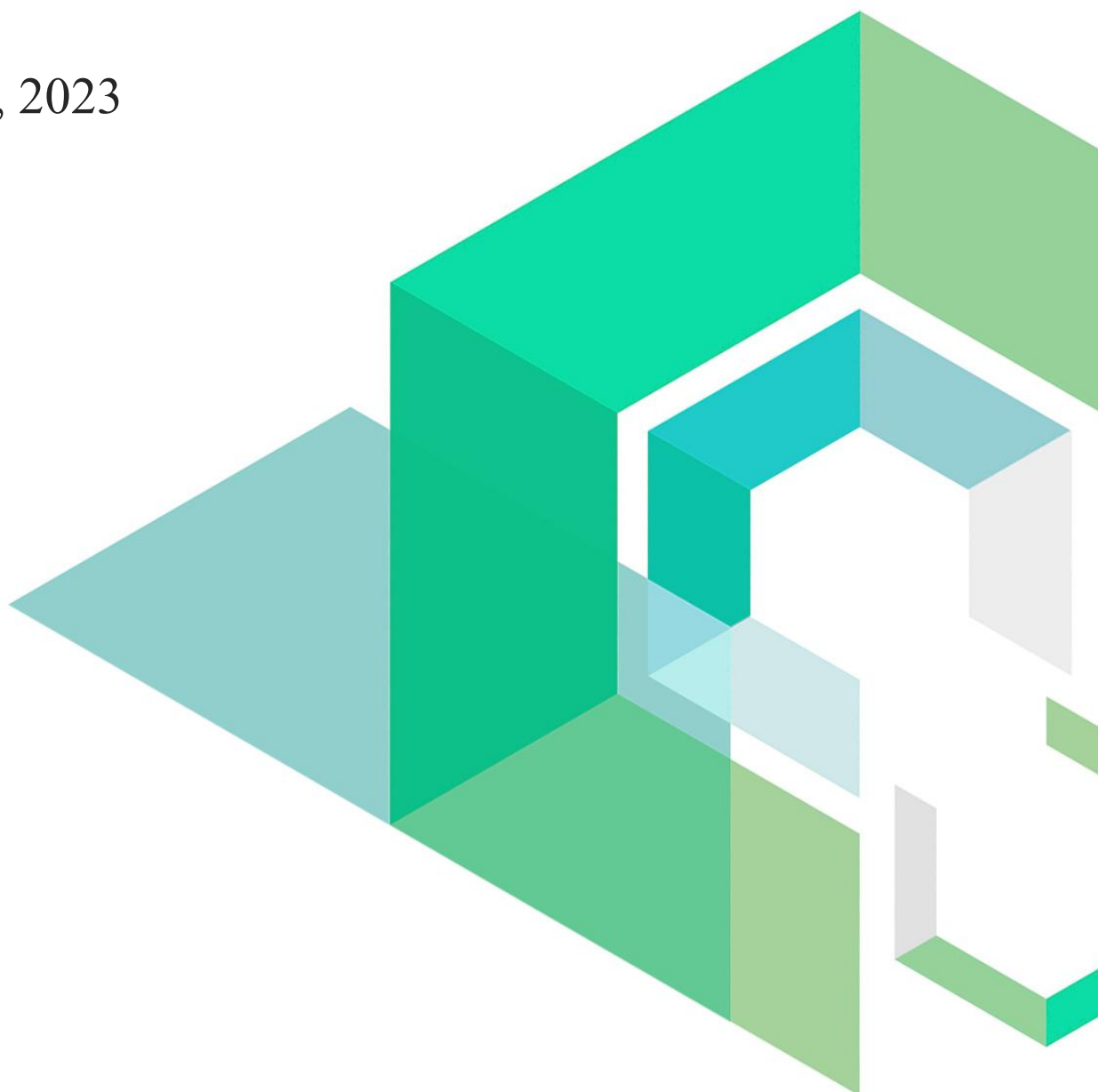
Contents

Summary of Audit Results

After auditing, 1 Low risk items were identified in the Portal project. Specific audit details will be presented in the **Findings** section. Users should pay attention to the following aspects when interacting with this project:

*Notes:

● **Risk Description:**

Users should concern conditions as below:

1. When the portal contract is deployed, user should concern the vestingAllocInBps variable value which can represent the ratio for user to claim the actual token amount (The project team states that the amount of percent in each phase is decided by the project).

2. The project team can decide the token quantity issued for portal contract in each vesting phase.

Project Description:

1. Business overview

The portal project is the contracts for users to claim the distributed token after purchasing token from Arbipad contract. User can purchase using their own token through *buyTokens* function in Arbipad contract, and claim target token through *claimToken* function in portal contract (After examining the total amount raised in Arbipad contract, the project team will determine the percentage of total amount raised and send this corresponding percentage pre-sold token amount to portal contract). PortalFactory is the portal manager contract that create new portal. Ratio between original token and target token can determined by tokenPrice and vestingAllocInBps variable. Owner has the privilege to pause the contract.

1 Overview

1.1 Project Overview

Project Name	Portal
Platform	Arbipad
Audit scope	Portal.sol, PortalFactory.sol
File Hash	aca9b42cd21ec8aaeb4f9eb9cc23a5bc2f494f202fd643ec4e3811dce9bac220(Initial) f49e53d612cd180eb1c50957667d5fe54aee1ce8a2919c6ef8fbee16cb05a382(Finally)

1.2 Audit Overview

Audit work duration: Mar 15, 2023 –Mar 21, 2023

Audit methods: Formal Verification, Static Analysis, Typical Case Testing and Manual Review.

Audit team: Beosin Security Team.

2 Findings

Index	Risk description	Severity level	Status
Portal -1	The owner privilege is too high	Low	Partially Fixed

Status Notes:

1. Portal -1 is partially fixed and deployer can determine the vestingAllocInBps value which is represent the ratio for user to claim the actual token amount.

Finding Details:

[Portal -1] The owner privilege is too high

Severity Level	Low
Type	Business Security
Lines	Portal.sol #L46-166
Description	The owner has privilege to withdraw balance of contract of specified token, which will cause user can not claim their token. Owner also can change token address and token price. Token price can change the calculate result of token amount for claim. Change token address will cause user claim the different token, which is risk for user to purchase. Deployer can determine the value of vestingAllocInBps variable when create contract. The vestingAllocInBps is the variable represent the ratio for user to claim the actual token amount.

```
70      * @dev Claim all the token if something went wrong within this contract.
71      *
72      */
73 ∨   function emergencyWithdraw() external onlyOwner whenPaused {
74          uint256 _tokenBalance = _ERC20Interface.balanceOf(address(this));
75          _ERC20Interface.safeTransfer(msg.sender, _tokenBalance);
76      }
77
```

Figure 1 Source code of *emergencyWithdraw* function

```
56      * @dev Update config for this portal.
57      * @param _fundingPool for pool address, _tokenAddr
58      */
59 ∨   function updatePortalInfo(
60          address[] memory _fundingPool,
61          address _tokenAddress,
62          uint256 _tokenPrice
63 ∨   ) external onlyOwner whenPaused {
64          fundingPool = _fundingPool;
65          tokenAddress = _tokenAddress;
66          tokenPrice = _tokenPrice;
67      }
68
```

Figure 2 Source code of *updatePortalInfo* function

```
154 ∨   function _calculateClaimableToken(address _address) private view returns (uint256) {
155        uint256 _bpsDivisor = 10000;
156        uint256 _denominator = 10**18;
157        uint256 _totalAllocation = _userAllocation(_address);
158        return FullMath.mulDiv((_totalAllocation * vestingAllocInBps) / _bpsDivisor, _denominator, tokenPrice);
159    }
160 }
```

Figure 3 Source code of *_calculateClaimableToken* function

Recommendations	It is recommended to use multi-signature wallet or DAO to manage contract, and tokenAddress variable should not change after construction.
Status	Partially Fixed. Project delete the *updatePortalInfo* and *emergencyWithdraw* function in new version.

3 Appendix

3.1 Vulnerability Assessment Metrics and Status in Smart Contracts

3.1.1 Metrics

In order to objectively assess the severity level of vulnerabilities in blockchain systems, this report provides detailed assessment metrics for security vulnerabilities in smart contracts with reference to CVSS 3.1 (Common Vulnerability Scoring System Ver 3.1).

According to the severity level of vulnerability, the vulnerabilities are classified into four levels: "critical", "high", "medium" and "low". It mainly relies on the degree of impact and likelihood of exploitation of the vulnerability, supplemented by other comprehensive factors to determine of the severity level.

Impact / Likelihood	Severe	High	Medium	Low
Probable	Critical	High	Medium	Low
Possible	High	High	Medium	Low
Unlikely	Medium	Medium	Low	Info
Rare	Low	Low	Info	Info

3.1.2 Degree of impact

● **Severe**

Severe impact generally refers to the vulnerability can have a serious impact on the confidentiality, integrity, availability of smart contracts or their economic model, which can cause substantial economic losses to the contract business system, large-scale data disruption, loss of authority management, failure of key functions, loss of credibility, or indirectly affect the operation of other smart contracts associated with it and cause substantial losses, as well as other severe and mostly irreversible harm.

● **High**

High impact generally refers to the vulnerability can have a relatively serious impact on the confidentiality, integrity, availability of the smart contract or its economic model, which can cause a greater economic loss, local functional unavailability, loss of credibility and other impact to the contract business system.

- **Medium**

Medium impact generally refers to the vulnerability can have a relatively minor impact on the confidentiality, integrity, availability of the smart contract or its economic model, which can cause a small amount of economic loss to the contract business system, individual business unavailability and other impact.

- **Low**

Low impact generally refers to the vulnerability can have a minor impact on the smart contract, which can pose certain security threat to the contract business system and needs to be improved.

3.1.4 Likelihood of Exploitation

- **Probable**

Probable likelihood generally means that the cost required to exploit the vulnerability is low, with no special exploitation threshold, and the vulnerability can be triggered consistently.

- **Possible**

Possible likelihood generally means that exploiting such vulnerability requires a certain cost, or there are certain conditions for exploitation, and the vulnerability is not easily and consistently triggered.

- **Unlikely**

Unlikely likelihood generally means that the vulnerability requires a high cost, or the exploitation conditions are very demanding and the vulnerability is highly difficult to trigger.

- **Rare**

Rare likelihood generally means that the vulnerability requires an extremely high cost or the conditions for exploitation are extremely difficult to achieve.

3.1.5 Fix Results Status

Status	Description
Fixed	The project party fully fixes a vulnerability.
Partially Fixed	The project party did not fully fix the issue, but only mitigated the issue.
Acknowledged	The project party confirms and chooses to ignore the issue.

3.2 Audit Categories

No.	Categories	Subitems
1	Coding Conventions	Compiler Version Security
		Deprecated Items
		Redundant Code
		require/assert Usage
		Gas Consumption
2	General Vulnerability	Integer Overflow/Underflow
		Reentrancy
		Pseudo-random Number Generator (PRNG)
		Transaction-Ordering Dependence
		DoS (Denial of Service)
		Function Call Permissions
		call/delegatecall Security
		Returned Value Security
		tx.origin Usage
		Replay Attack
		Overriding Variables
		Third-party Protocol Interface Consistency
3	Business Security	Business Logics
		Business Implementations
		Manipulable Token Price
		Centralized Asset Control
		Asset Tradability
		Arbitrage Attack

Beosin classified the security issues of smart contracts into three categories: Coding Conventions, General Vulnerability, Business Security. Their specific definitions are as follows:

- **Coding Conventions**

Audit whether smart contracts follow recommended language security coding practices. For example, smart contracts developed in Solidity language should fix the compiler version and do not use deprecated keywords.

● **General Vulnerability**

General Vulnerability include some common vulnerabilities that may appear in smart contract projects. These vulnerabilities are mainly related to the characteristics of the smart contract itself, such as integer overflow/underflow and denial of service attacks.

● **Business Security**

Business security is mainly related to some issues related to the business realized by each project, and has a relatively strong pertinence. For example, whether the lock-up plan in the code match the white paper, or the flash loan attack caused by the incorrect setting of the price acquisition oracle.

[*]Note that the project may suffer stake losses due to the integrated third-party protocol. This is not something Beosin can control. Business security requires the participation of the project party. The project party and users need to stay vigilant at all times.

3.3 Disclaimer

The Audit Report issued by Beosin is related to the services agreed in the relevant service agreement. The Project Party or the Served Party (hereinafter referred to as the "Served Party") can only be used within the conditions and scope agreed in the service agreement. Other third parties shall not transmit, disclose, quote, rely on or tamper with the Audit Report issued for any purpose.

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The Audit Report issued by Beosin in no way provides investment advice on any project, nor should it be utilized as investment suggestions of any type. This report represents an extensive evaluation process designed to help our customers improve code quality while mitigating the high risks in blockchain.

3.4 About Beosin

Beosin is the first institution in the world specializing in the construction of blockchain security ecosystem. The core team members are all professors, postdocs, PhDs, and Internet elites from world-renowned academic institutions. Beosin has more than 20 years of research in formal verification technology, trusted computing, mobile security and kernel security, with overseas experience in studying and collaborating in project research at well-known universities. Through the security audit and defense deployment of more than 2,000 smart contracts, over 50 public blockchains and wallets, and nearly 100 exchanges worldwide, Beosin has accumulated rich experience in security attack and defense of the blockchain field, and has developed several security products specifically for blockchain.