April 2022

QuickSwap Security Audit Report

Security Assessment

Z INSTITUTE

Summary

This report has been prepared for QuickSwap to discover issues and vulnerabilities in the source code of the staking contract as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Static Analysis, Manual Review, and Testnet Deployment techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors
- Assessing the codebase to ensure compliance with current best practices and industry standards
- Ensuring contract logic meets the specifications and intentions of the client
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders
- Thorough line-by-line manual review of the entire codebase by industry experts

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Enhance general coding practices for better structures of source codes
- Add enough unit tests to cover the possible use cases
- Provide more comments per each function for readability, especially contracts that are verified in public
- Provide more transparency on privileged activities once the protocol is live

Overview

Project Summary

Project Name	QuickSwap Token Split
Description	The redenominated QUICK token will become xQUICK with an increase in total supply from 1 million to 1 billion.
Platform	Polygon
Language	Solidity
Codebase	`https://github.com/QuickSwap/token-swap.git`
Commits	`fdeb9f4560708cfba73d117e2ae1ed2d05cb61b1`

Audit Summary

Delivery Date	April. 19, 2022
Audit Methodology	Static Analysis, Manual Review
Key Components	Quick, QuickToken

Audit Scope

Name	**File**	**SHA Checksum**
QuickToken	`contracts/QuickEthereum.sol`	`4ccdfefc125eee160a333360bc6ced80e7858badeafe63796464af0b701bd48b`
Quick	`contracts/QuickPolygon.sol`	`12527776bc18061fab2e0d58edadd1619fd7a4125a9e4a715f2c82705bd6a4d6`

Contents

1 Understandings

1.1 Overview

To help facilitate further integrations and attract new buyers who are currently put off by QUICK's high price per unit, the governance proposal[1] on the QUICK token split has passed with an increase in total supply of QUICK from 1 million to 1 billion. This means that a QUICK holder who owns 1 QUICK now would own 1000 xQUICK after the split. A TokenSwap contract will be deployed on Polygon to perform the exchange of QUICK and xQUICK tokens.

1.2 Privileged functions

1.2.1 Quick (on Polygon)

- `deposit()`: As declared in the documentation[2], this function is called by the `ChildChainManagerProxy` contract whenever a deposit is initiated from the root chain (Ethereum). This deposit function internally mints the token on the child chain (Polygon). The `ChildChainManagerProxy`'s address is denoted as the `gateway` variable, specified on contract deployment.

1.2.2 QuickToken (on Ethereum)

- `mint()`: Only the minter address can mint new tokens.
- `setMinter()`: Only the current minter can set a new minter. Initially, the minter address is specified on contract deployment.

[1] https://quickswap-layer2.medium.com/should-quickswap-do-a-token-split-to-make-quick-more-appealing-to-investors-e739cf2cac98

[2] https://docs.polygon.technology/docs/develop/ethereum-polygon/pos/mapping-assets/#custom-child-token

1.3 Consistency with specifications

We remark that the token contracts meet specification requirements and detail them below.

- The total supply of the QUICK token will be increased to 1 billion.
- A QUICK holder who owns 1 QUICK can swap for 1000 xQUICK after the split.

1.4 Event logging

After our examination, we remark that all of the main functions listed below have excellent event logs:

- `deposit()`
- `withdraw()`
- `mint()`
- `setMinter()`
- `transfer()`
- `transferFrom()`
- `approve()`

We refer to the link[3] for the importance of the event logs.

1.5 Difference Check

Since the contracts are a modification of the already deployed contracts in production, we highlight the lines of differences between the new and the deployed contracts below.

[3] https://consensys.github.io/smart-contract-best-practices/recommendations/#use-events-to-monitor-contract-activity

1.5.1 QuickEthereum

DEPLOYED CONTRACT:
https://etherscan.io/address/0x6c28aef8977c9b773996d0e8376d2ee379446f2f#code

LINES CHANGED:

```
- string public constant name = "Quickswap";
+ string public constant name = "QuickSwap";
...
- uint public totalSupply = 1000000000000000000000000;
+ uint public totalSupply = 1_000_000_000e18;
```

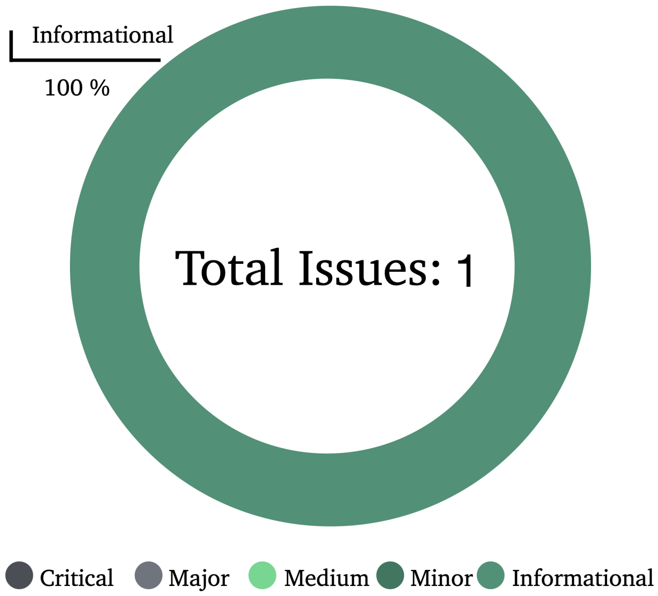
1.5.2 QuickPolygon

DEPLOYED CONTRACT:
https://polygonscan.com/address/0x831753dd7087cac61ab5644b308642cc1c33dc13#code

LINES CHANGED:

```
- string public constant name = "Quickswap";
+ string public constant name = "QuickSwap";
```

2 Findings



ID	Title	Category	Severity	Status
SSL-01	Potential Increase on Total Supply	Logical Issue	Informational	Resolved

2.1 SSL-01 | Potential Increase on Total Supply

Category	Severity	Location	Status
Logical Issue	Informational	`contracts/QuickEthereum.sol: line 261`	Resolved

2.1.1 Description

On contract deployment, the 1 billion total supply of the tokens will be minted and sent to the initial address specified. The timestamp after which minting may occur will also be determined on contract construction and cannot be further modified.

Although the current token supply cap is fixed at 1 billion, the mint() function allows the minter to mint new tokens after the specified timestamp. Thus, the total supply could potentially increase once the minting happens.

```
function mint(address dst, uint rawAmount) external {
    require(msg.sender == minter, "Quick::mint: only the minter can mint");
    require(block.timestamp >= mintingAllowedAfter, "Quick::mint: minting not
    allowed yet");
    ....
}
```

2.1.2 Response

The mint function is taken from our previous token contract which is already deployed. As per our tokenomics, 2% of supply will be minted every year to tackle inflation starting from 4th year of token launch.

Appendices

Appendix A

Finding Categories

Gas Optimization Gas Optimization findings do not affect the functionality of the code but generate different, more optimal compiled code resulting in a reduction on the total gas cost of a transaction.

Mathematical Operations Mathematical Operation findings relate to mishandling of math formulas, such as overflows, incorrect operations etc. Logical Issue Logical Issue findings detail a fault in the logic of the linked code, such as an incorrect notion on how block.timestamp works.

Control Flow Control Flow findings concern the access control imposed on functions, such as owner-only functions being invoke-able by anyone under certain circumstances.

Volatile Code Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.

Data Flow Data Flow findings describe faults in the way data is handled at rest and in memory, such as the result of a struct assignment operation affecting an in-memory struct rather than an in-storage one.

Language Specific Language Specific findings are issues that would only arise within Solidity, i.e. incorrect usage of private or delete.

Centralization / Privilege Centralization / Privilege findings refer to the logic or implementation of the code exposing to concerns or scenarios that would go against decentralized manners.

Coding Style Coding Style findings usually do not affect the generated byte-code but rather comment on how to make the codebase more legible and, as a result, easily maintainable.

Inconsistency Inconsistency findings refer to functions that should seemingly behave similarly yet contain different code,such as a constructor assignment imposing different require statements on the input variables than a setter function.

Magic Numbers Magic Number findings refer to numeric literals that are expressed in the codebase in their raw format and should otherwise be specified as constant contract variables aiding in their legibility and maintainability.

Compiler Error Compiler Error findings refer to an error in the structure of the code that renders it impossible to compile using the specified version of the project.

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