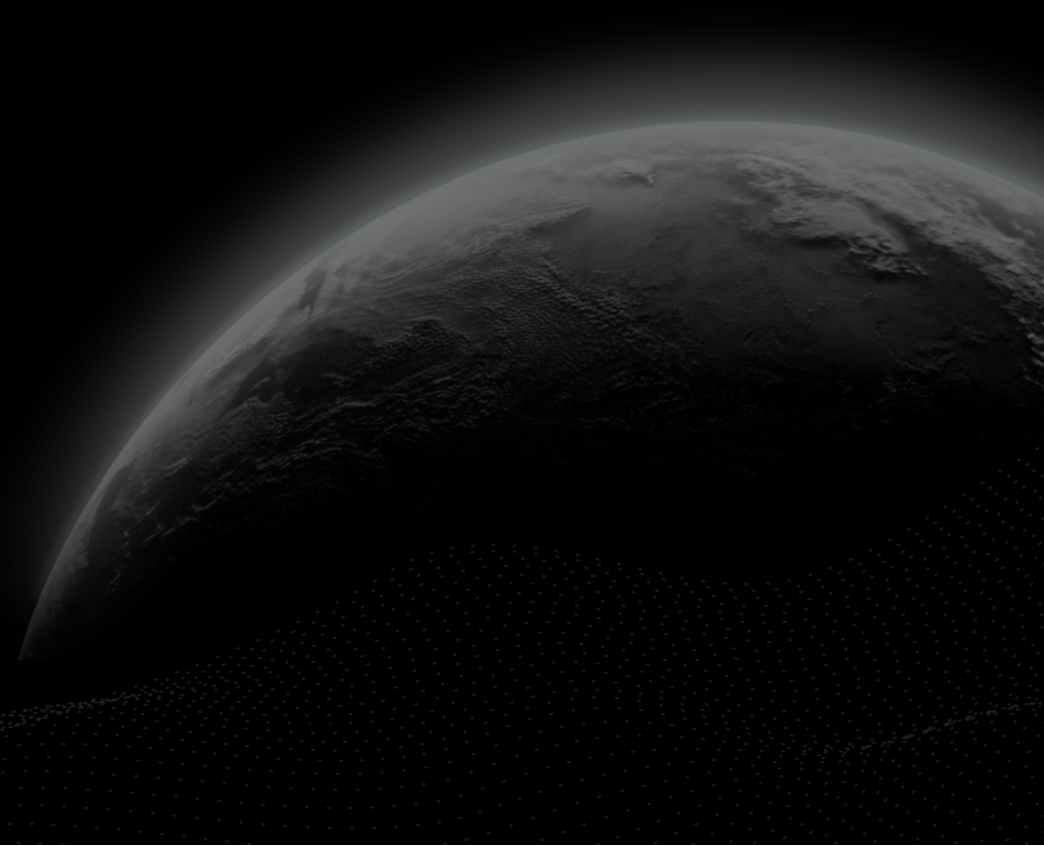
Security Assessment

UniRouter

CertiK Assessed on Apr 18th, 2024



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UniRouter

The security assessment was prepared by CertiK, the leader in Web3.0 security.

Executive Summary

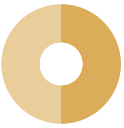
TYPES	ECOSYSTEM	METHODS
DeFi	Binance Smart Chain (BSC) | Ethereum (ETH)	Formal Verification, Manual Review, Static Analysis

LANGUAGE	TIMELINE	KEY COMPONENTS
Solidity	Delivered on 04/18/2024	N/A

CODEBASE
fcf214dee947356bca4457794ea668a28d38a156
View All in Codebase Page

COMMITS
fcf214dee947356bca4457794ea668a28d38a156
View All in Codebase Page

Vulnerability Summary



2	2	0	0	0	0
Total Findings	Resolved	Mitigated	Partially Resolved	Acknowledged	Declined

Count	Severity	Status	Description
0	Critical		Critical risks are those that impact the safe functioning of a platform and must be addressed before launch. Users should not invest in any project with outstanding critical risks.
0	Major		Major risks can include centralization issues and logical errors. Under specific circumstances, these major risks can lead to loss of funds and/or control of the project.
1	Medium	1 Resolved	Medium risks may not pose a direct risk to users' funds, but they can affect the overall functioning of a platform.
1	Minor	1 Resolved	Minor risks can be any of the above, but on a smaller scale. They generally do not compromise the overall integrity of the project, but they may be less efficient than other solutions.
0	Informational		Informational errors are often recommendations to improve the style of the code or certain operations to fall within industry best practices. They usually do not affect the overall functioning of the code.

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CODEBASE | UNIROUTER

Repository

fcf214dee947356bca4457794ea668a28d38a156

Commit

fcf214dee947356bca4457794ea668a28d38a156

AUDIT SCOPE | UNIROUTER

1 file audited ● 1 file with Resolved findings

ID	Repo	File	SHA256 Checksum
● URO	UniRouter/unirouter-staking-contract	src/URORewardPoints.sol	747d1d0444b8eb23ad11e8ce38d6685f131ce61b877c3640677592e2891b22c1

APPROACH & METHODS | UNIROUTER

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

- Testing the smart contracts against both common and uncommon attack vectors;
- 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.

REVIEW NOTES | UNIROUTER

Overview

The **UniRouter** protocol introduces a point system where users earn points based on the duration and quantity of tokens staked. Users have the flexibility to unstake their tokens at any time.

External Dependencies

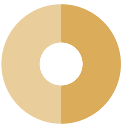
The project primarily utilizes the `IERC20` from OpenZeppelin. Given that the `OpenZeppelin` contracts are under constant development, it is advised that the team regularly checks for updates to the library to prevent unforeseen issues.

Third-Party Dependency Usage

The contract engages with an external `token`, which is an ERC20 token. This `token` represents the asset that users stake, with the contract assigning points based on both the quantity of the `token` staked and the duration it is held.

The scope of the audit treats third-party entities as black boxes and assumes their functional correctness. However, in the real world, third parties can be compromised and this may lead to lost or stolen assets. In addition, upgrades of third parties can possibly create severe impacts.

FINDINGS | UNIROUTER



2	0	0	1	1	0
Total Findings	Critical	Major	Medium	Minor	Informational

This report has been prepared to discover issues and vulnerabilities for UniRouter. Through this audit, we have uncovered 2 issues ranging from different severity levels. Utilizing the techniques of Formal Verification, Manual Review & Static Analysis to complement rigorous manual code reviews, we discovered the following findings:

ID	Title	Category	Severity	Status
URO-03	Incompatibility With Deflationary Tokens	Logical Issue	Medium	Resolved
URO-02	Check-Effects-Interactions Pattern Violation	Logical Issue	Minor	Resolved

URO-03 | INCOMPATIBILITY WITH DEFLATIONARY TOKENS

Category	Severity	Location	Status
Logical Issue	Medium	src/URORewardPoints.sol: 47	Resolved

Description

When transferring deflationary ERC20 tokens, the input amount may not be equal to the received amount due to the charged transaction fee. For example, if a user sends 100 deflationary tokens (with a 10% transaction fee), only 90 tokens actually arrived to the contract. However, a failure to discount such fees may allow the same user to withdraw 100 tokens from the contract, which causes the contract to lose 10 tokens in such a transaction.

Reference: https://thoreum-finance.medium.com/what-exploit-happened-today-for-gocerberus-and-garuda-also-for-lokum-ybear-piggy-caramelswap-3943ee23a39f

If the `token` is a deflationary ERC20 token, when `stake` executes the `token.transferFrom()` function to receive `amount` tokens, the actual quantity of tokens received by the contract might be lower than the specified `amount`.

Recommendation

We advise the client to regulate the set of tokens supported and add necessary mitigation mechanisms to keep track of accurate balances if there is a need to support deflationary tokens.

Alleviation

[UniRouter Team, 04/17/2024]: The team resolved this issue at commit 3decaedf32dd20312785ea9ac16e0e5f5387ef8e.

URO-02 | CHECK-EFFECTS-INTERACTIONS PATTERN VIOLATION

Category	Severity	Location	Status
Logical Issue	Minor	src/URORewardPoints.sol: 39~50	Resolved

Description

This Checks-Effects-Interactions Pattern is a best practice for writing secure smart contracts that involves performing all state changes before making any external function calls.

Recommendation

It is recommended to follow checks-effects-interactions pattern for cases like this. It shields public functions from re-entrancy attacks. It's always a good practice to follow this pattern. `checks-effects-interactions` pattern also applies to ERC20 tokens as they can inform the recipient of a transfer in certain implementations.

Reference: https://docs.soliditylang.org/en/develop/security-considerations.html?highlight=check-effects%23use-the-checks-effects-interactions-pattern

Alleviation

[UniRouter Team, 04/13/2024]: The team headed the advice and resolved this issue in the commit fca10f13c128f352fc77f584c0d0d399c026b385.

OPTIMIZATIONS | UNIROUTER

ID	Title	Category	Severity	Status
URO-04	Variable Can Be Declared As Immutable	Volatile Code	Optimization	Resolved

URO-04 | VARIABLE CAN BE DECLARED AS IMMUTABLE

Category	Severity	Location	Status
Volatile Code	Optimization	src/URORewardPoints.sol: 14~15	Resolved

Description

The variable **token** assigned in the constructor can be declared as `Immutable`. Immutable state variables can be assigned during contract creation, but will remain constant throughout the lifetime of a deployed contract. An advantage of immutable variables is that reading them is significantly cheaper than reading from regular state variables since they are not located in storage.

Recommendation

We recommend declaring state variable **token** as immutable.

Alleviation

[UniRouter Team, 04/13/2024]: The team headed the advice and resolved this issue in the commit 781af030e4d9a435563a1069a157c90185445226.

APPENDIX | UNIROUTER

Finding Categories

Categories	Description
Volatile Code	Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases and may result in vulnerabilities.
Logical Issue	Logical Issue findings indicate general implementation issues related to the program logic.

Checksum Calculation Method

The "Checksum" field in the "Audit Scope" section is calculated as the SHA-256 (Secure Hash Algorithm 2 with digest size of 256 bits) digest of the content of each file hosted in the listed source repository under the specified commit.

The result is hexadecimal encoded and is the same as the output of the Linux "sha256sum" command against the target file.

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