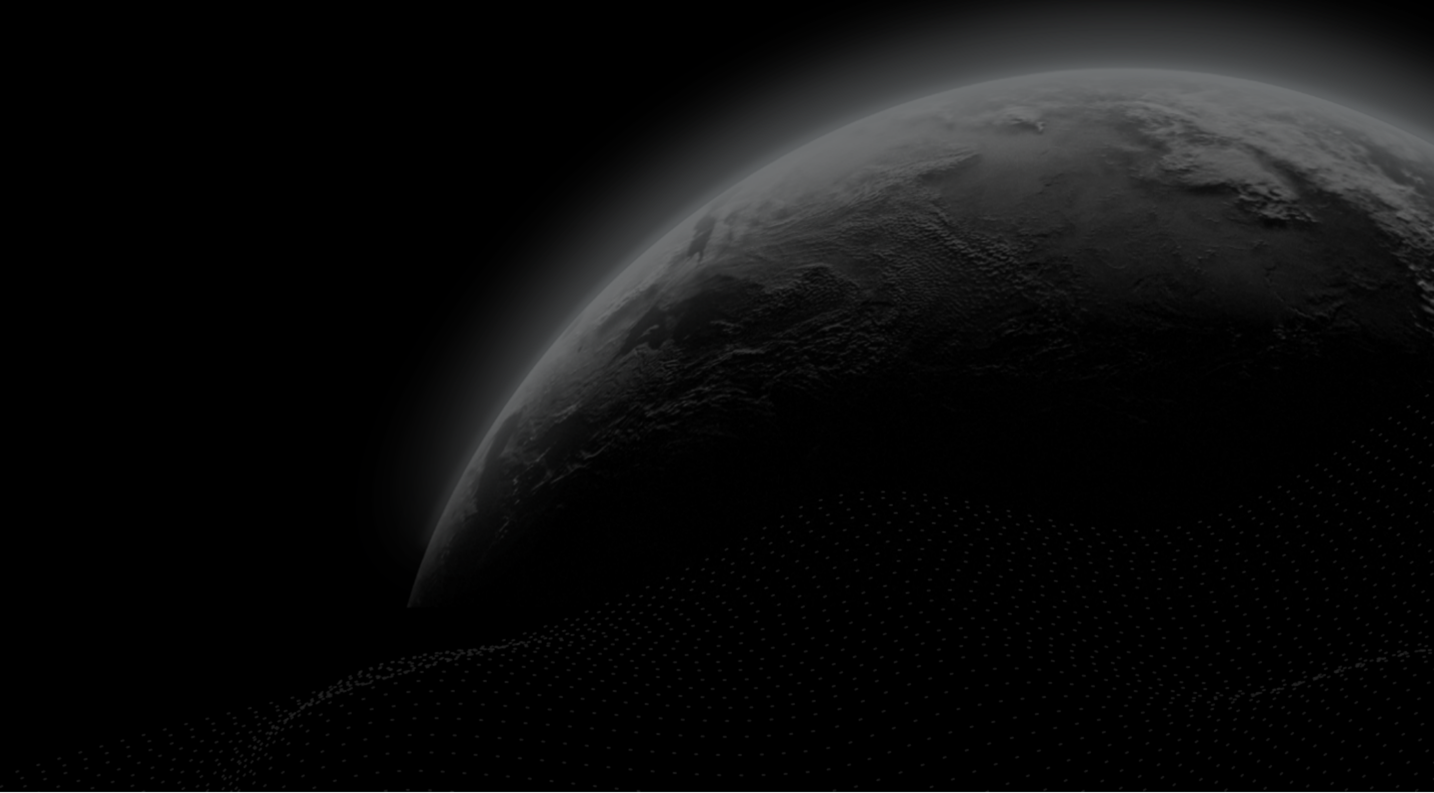
Security Assessment

Rivalz Network

CertiK Assessed on Oct 24th, 2024



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

Executive Summary

TYPES	ECOSYSTEM	METHODS
ERC-20	Arbitrum (ARB)	Formal Verification, Manual Review, Static Analysis

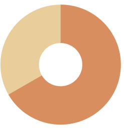
LANGUAGE	TIMELINE	KEY COMPONENTS
Solidity	Delivered on 10/24/2024	N/A

CODEBASE	COMMITS
sepolia View All in Codebase Page	0xca54edad89ee780b9e973bc2813384fead8fdb2a View All in Codebase Page

Highlighted Centralization Risks

ⓘ Initial owner token share is 100%

Vulnerability Summary



3	0	0	0	3	0
Total Findings	Resolved	Mitigated	Partially Resolved	Acknowledged	Declined

🟥	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.
🟧	2	Major	2 Acknowledged	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.
🟨	0	Medium		Medium risks may not pose a direct risk to users' funds, but they can affect the overall functioning of a platform.
🟨	1	Minor	1 Acknowledged	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 | RIVALZ NETWORK

Repository

sepolia

Commit

0xca54edad89ee780b9e973bc2813384fead8fdb2a

AUDIT SCOPE | RIVALZ NETWORK

2 files audited ● 1 file with Acknowledged findings ● 1 file without findings

ID	Repo	File	SHA256 Checksum
● RRN	CertiKProject/certik-audit-projects	projects/Rivalz Network/Riz.sol	cf7a85befe3b3bc5ded26191e891694f344a6fdf7081fbbf63ca7770db9b2162
● 0XC	sepolia	0xca54edad89ee780b9e973bc2813384fead8fdb2a	

APPROACH & METHODS | RIVALZ NETWORK

This report has been prepared for Rivalz to discover issues and vulnerabilities in the source code of the Rivalz Network 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 | RIVALZ NETWORK

Overview

In the **Rivalz Network** project, the `RivalzToken` is a fixed-supply token with a total supply of 5_000_000_000 tokens, each with 8 decimal places. The contract includes a burn function and is initialized by minting the entire supply to the deployer's address. It inherits from OpenZeppelin's `ERC20` and `Ownable` contracts, providing standard token features and ownership management.

External Dependencies

In **Rivalz Network**, the module inherits or uses a few of the depending injection contracts or addresses to fulfill the need of its business logic. The scope of the audit treats third party entities as black boxes and assume their functional correctness. However, in the real world, third parties can be compromised and this may lead to lost or stolen assets.

The following library/contract is considered as the third-party dependency:

- @openzeppelin/contracts/

We assume these contracts or addresses are valid and non-vulnerable actors and implementing proper logic to collaborate with the current project.

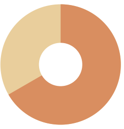
Privileged Functions

In the **Rivalz Network** project, the privileged roles are adopted to ensure the dynamic runtime updates of the project, which are specified in the `Centralization` finding.

The advantage of those privileged roles in the codebase is that the client reserves the ability to adjust the protocol according to the runtime required to best serve the community. It is also worth noting the potential drawbacks of these functions, which should be clearly stated through the client's action/plan. Additionally, if the private keys of the privileged accounts are compromised, it could lead to devastating consequences for the project.

To improve the trustworthiness of the project, dynamic runtime updates in the project should be notified to the community. Any plan to invoke the aforementioned functions should be also considered to move to the execution queue of the `Timelock` contract.

FINDINGS | RIVALZ NETWORK



3	0	2	0	1	0
Total Findings	Critical	Major	Medium	Minor	Informational

This report has been prepared to discover issues and vulnerabilities for Rivalz Network. Through this audit, we have uncovered 3 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
RRN-01	**Initial Token Distribution**	**Centralization**	**Major**	● **Acknowledged**
RRN-02	**Centralization Risks**	**Centralization**	**Major**	● **Acknowledged**
RRN-03	Solidity 0.8.20+ Version Won't Work On All Chains	Language Version	Minor	● Acknowledged

RRN-01 | INITIAL TOKEN DISTRIBUTION

Category	Severity	Location	Status
Centralization	● **Major**	**projects/Rivalz Network/Riz.sol (1014-0xcA54ed): 11~12**	● **Acknowledged**

Description

All of the `RIZ` tokens are sent to the contract deployer. This is a centralization risk because the deployer can distribute tokens without obtaining the consensus of the community. Any compromise to the deployer's account may allow a hacker to steal and sell tokens on the market, resulting in severe damage to the project.

Recommendation

It is recommended that the team be transparent regarding the initial token distribution process. The token distribution plan should be published in a public location that the community can access. The team should make efforts to restrict access to the private keys of the deployer account or EOAs. A multi-signature (⅔, ⅗) wallet can be used to prevent a single point of failure due to a private key compromise. Additionally, the team can lock up a portion of tokens, release them with a vesting schedule for long-term success, and deanonymize the project team with a third-party KYC provider to create greater accountability.

Alleviation

[Rivalz Network, 10/23/2024]: According to the team's contract deployed in the transaction 0x6a6c17d758f9f28040e14e357d61e95c187d8e3cd0db88e0b82bf0022d35bd08, 5,000,000,000 RIZ tokens are distributed to the contract deployer at address 0x7992C148E97374394F0842B878eb8a2fcDbbEc12.

RRN-02 | CENTRALIZATION RISKS

Category	Severity	Location	Status
Centralization	● **Major**	**projects/Rivalz Network/Riz.sol (1014-0xcA54ed): 7~8**	● **Acknowledged**

Description

The `RivalzToken` contract inherits from `Ownable.sol`, the `_owner` has authority over the following functions:

- `renounceOwnership` : Leaves the contract without owner.
- `transferOwnership` : Transfers ownership of the contract to a new account (`newOwner`).

Any compromise of the `_owner` account could allow an attacker to exploit this authority, potentially removing the current owner or transferring ownership to a malicious account.

Recommendation

The risk describes the current project design and potentially makes iterations to improve in the security operation and level of decentralization, which in most cases cannot be resolved entirely at the present stage. We advise the client to carefully manage the privileged account's private key to avoid any potential risks of being hacked. In general, we strongly recommend centralized privileges or roles in the protocol be improved via a decentralized mechanism or smart-contract-based accounts with enhanced security practices, e.g., multisignature wallets.

Indicatively, here are some feasible suggestions that would also mitigate the potential risk at a different level in terms of short-term, long-term and permanent:

Short Term:

Timelock and Multi sign (⅔, ⅗) combination *mitigate* by delaying the sensitive operation and avoiding a single point of key management failure.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
  AND
- Assignment of privileged roles to multi-signature wallets to prevent a single point of failure due to the private key compromised;
  AND
- A medium/blog link for sharing the timelock contract and multi-signers addresses information with the public audience.

Long Term:

Timelock and DAO, the combination, *mitigate* by applying decentralization and transparency.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
  AND
- Introduction of a DAO/governance/voting module to increase transparency and user involvement.
  AND
- A medium/blog link for sharing the timelock contract, multi-signers addresses, and DAO information with the public audience.

Permanent:

Renouncing the ownership or removing the function can be considered *fully resolved*.

- Renounce the ownership and never claim back the privileged roles.
  OR
- Remove the risky functionality.

Alleviation

[Rivalz Network, 10/23/2024]: Issue acknowledged. I won't make any changes for the current version.

RRN-03 | SOLIDITY 0.8.20+ VERSION WON'T WORK ON ALL CHAINS

Category	Severity	Location	Status
Language Version	● Minor	projects/Rivalz Network/Riz.sol (1014-0xcA54ed): 2~3	● Acknowledged

Description

The compiler for Solidity 0.8.20 switches the default target EVM version to Shanghai, which includes the new `PUSH0` opcode. The compiler for Solidity 0.8.20+ did not remove the `PUSH0` opcode. This opcode may not yet be supported on all chains, leading to failed deployments. To work around this issue, use an earlier EVM version.

Recommendation

It's recommended to pay attention to the EVM complier version when using 0.8.20+ solidity version in the contract.

Alleviation

[Rivalz Network, 10/23/2024]: Issue acknowledged. I won't make any changes for the current version. We will deploy on ETH and quite sure this works.

APPENDIX | RIVALZ NETWORK

Finding Categories

Categories	Description
Language Version	Language Version findings indicate that the code uses certain compiler versions or language features with known security issues.
Centralization	Centralization findings detail the design choices of designating privileged roles or other centralized controls over the code.

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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