



Security Assessment

Imperium Empires

Dec 10th, 2021

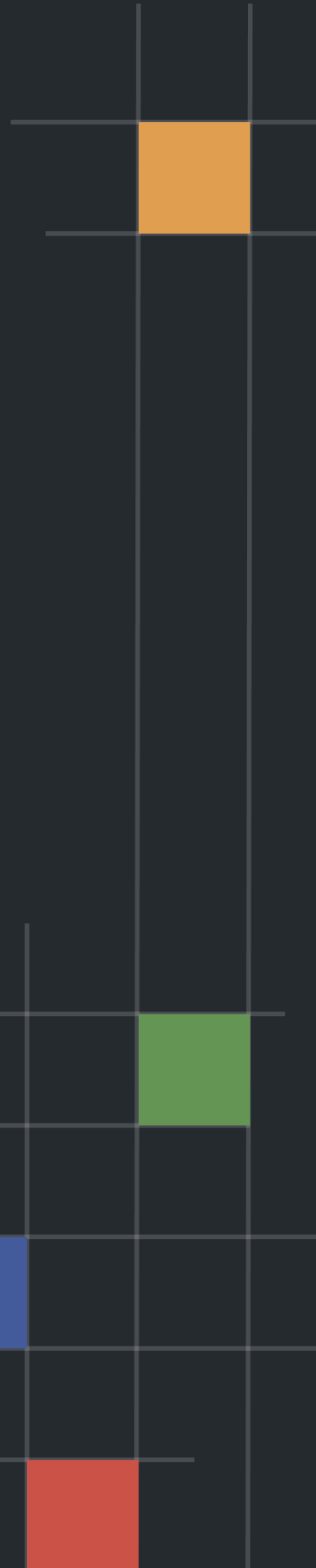


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Summary

This report has been prepared for Imperium Empires to discover issues and vulnerabilities in the source code of the Imperium Empires project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Static Analysis and Manual Review 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 | Imperium Empires |
| Platform | Avalanche |
| Language | Solidity |
| Codebase | https://github.com/Imperium-Empires/ime-token |
| Commit | 3949f458f201c375a65f1d63b36d0c36cdfa39a7 |

Audit Summary

| | |
|-------------------|--------------------------------|
| Delivery Date | Dec 10, 2021 |
| Audit Methodology | Static Analysis, Manual Review |
| Key Components | |

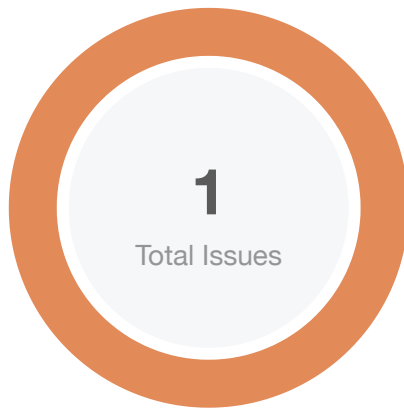
Vulnerability Summary

| Vulnerability Level | Total | ⚠ Pending | ⊗ Declined | ℹ Acknowledged | 🕒 Partially Resolved | ✅ Resolved |
|---------------------|-------|-----------|------------|----------------|----------------------|------------|
| ● Critical | 0 | 0 | 0 | 0 | 0 | 0 |
| ● Major | 1 | 0 | 0 | 1 | 0 | 0 |
| ● Medium | 0 | 0 | 0 | 0 | 0 | 0 |
| ● Minor | 0 | 0 | 0 | 0 | 0 | 0 |
| ● Informational | 0 | 0 | 0 | 0 | 0 | 0 |
| ● Discussion | 0 | 0 | 0 | 0 | 0 | 0 |

Audit Scope

| ID | File | SHA256 Checksum |
|-----|--------------------------|--|
| IET | ImperiumEmpiresToken.sol | 3ef14e761cdefbf9c54c9f61c68ab5e1c5c9fde920fdf23b79fb149e7445ae81 |

Findings



| | |
|---|-------------|
| ■ Critical | 0 (0.00%) |
| ■ Major | 1 (100.00%) |
| ■ Medium | 0 (0.00%) |
| ■ Minor | 0 (0.00%) |
| ■ Informational | 0 (0.00%) |
| ■ Discussion | 0 (0.00%) |

| ID | Title | Category | Severity | Status |
|--------|----------------------------|----------------------------|---|----------------|
| IET-01 | Initial token distribution | Centralization / Privilege | ● Major | ⓘ Acknowledged |

IET-01 | Initial token distribution

| Category | Severity | Location | Status |
|----------------------------|----------|------------------------------|----------------|
| Centralization / Privilege | ● Major | ImperiumEmpiresToken.sol: 13 | 📄 Acknowledged |

Description

All of the `IME` tokens are sent to the contract deployer when deploying the contract. This could be a centralization risk as the deployer can distribute `IME` tokens without obtaining the consensus of the community.

Recommendation

We recommend the team be transparent regarding the initial token distribution process, and the team shall make enough efforts to restrict the access of the private key.

Alleviation

[Imperium Empires]: a timelock multisig would be used to make sure there is 1. No single point of failure and 2. Users have sufficient time to react on any potential upgrade of the protocol.

Appendix

Finding Categories

Centralization / Privilege

Centralization / Privilege findings refer to either feature logic or implementation of components that act against the nature of decentralization, such as explicit ownership or specialized access roles in combination with a mechanism to relocate funds.

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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About

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