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SECURITY AUDIT OF

KOAKUMA TOKEN SMART CONTRACT

Public Report

Jan 15, 2023

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Driving Technology > Forward

ABBREVIATIONS

Name	Description
Ethereum	An open source platform based on blockchain technology to create and distribute smart contracts and decentralized applications.
Ether (ETH)	A cryptocurrency whose blockchain is generated by the Ethereum platform. Ether is used for payment of transactions and computing services in the Ethereum network.
Smart contract	A computer protocol intended to digitally facilitate, verify or enforce the negotiation or performance of a contract.
Solidity	A contract-oriented, high-level language for implementing smart contracts for the Ethereum platform.
Solc	A compiler for Solidity.
ERC20	ERC20 (BEP20 in Binance Smart Chain or *x*RP20 in other chains) tokens are blockchain-based assets that have value and can be sent and received. The primary difference with the primary coin is that instead of running on their own blockchain, ERC20 tokens are issued on a network that supports smart contracts such as Ethereum or Binance Smart Chain.

EXECUTIVE SUMMARY

This Security Audit Report was prepared by Verichains Lab on Jan 15, 2023. We would like to thank the Koakuma for trusting Verichains Lab in auditing smart contracts. Delivering high-quality audits is always our top priority.

This audit focused on identifying security flaws in code and the design of the Koakuma Token Smart Contract. The scope of the audit is limited to the source code files provided to Verichains. Verichains Lab completed the assessment using manual, static, and dynamic analysis techniques.

During the audit process, the audit team had identified no vulnerable issues in the smart contracts code.

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1. MANAGEMENT SUMMARY

1.1. About Koakuma Token Smart Contract

Koakuma is an multiplayer online ARPG game with immersive combat systems and mechanics within a graphics intensive metaverse. All in-game items and creatures are blockchain based tokens and NFTs. Koakuma's visuals and gameplay are completely original and inspired by classics like Gigantic, World of Warcraft and Diablo.

1.2. Audit scope

This audit focused on identifying security flaws in code and the design of the Koakuma Token Smart Contract.

It was conducted on commit `5d1434f3d01fa0ac8d9f931edea1bdcdf01d89d3` from git repository *https://github.com/KoakumaLtd/koakuma-contracts*.

The following files were made available in the course of the review:

SHA256 Sum	File
`9f066510af8f86e7a968a4e8b41b4a80399fb87e9a082f989acf1ad1dc8a5a07`	`Koakuma.sol`

1.3. Audit methodology

Our security audit process for smart contract includes two steps:

- Smart contract codes are scanned/tested for commonly known and more specific vulnerabilities using public and RK87, our in-house smart contract security analysis tool.
- Manual audit of the codes for security issues. The contracts are manually analyzed to look for any potential problems.

Following is the list of commonly known vulnerabilities that were considered during the audit of the smart contract:

- Integer Overflow and Underflow
- Timestamp Dependence
- Race Conditions
- Transaction-Ordering Dependence
- DoS with (Unexpected) revert
- DoS with Block Gas Limit
- Gas Usage, Gas Limit and Loops
- Redundant fallback function

- Unsafe type Inference
- Reentrancy
- Explicit visibility of functions state variables (external, internal, private and public)
- Logic Flaws

For vulnerabilities, we categorize the findings into categories as listed in table below, depending on their severity level:

SEVERITY LEVEL	DESCRIPTION
CRITICAL	A vulnerability that can disrupt the contract functioning; creates a critical risk to the contract; required to be fixed immediately.
HIGH	A vulnerability that could affect the desired outcome of executing the contract with high impact; needs to be fixed with high priority.
MEDIUM	A vulnerability that could affect the desired outcome of executing the contract with medium impact in a specific scenario; needs to be fixed.
LOW	An issue that does not have a significant impact, can be considered as less important.

Table 1. Severity levels

1.4. Disclaimer

Please note that security auditing cannot uncover all existing vulnerabilities, and even an audit in which no vulnerabilities are found is not a guarantee for a 100% secure smart contract. However, auditing allows discovering vulnerabilities that were unobserved, overlooked during development and areas where additional security measures are necessary.

2. AUDIT RESULT

2.1. Overview

This is the ERC20 token contract in the Koakuma Token Smart Contract, which extends `Ownable`, `ERC20`, `ERC20Burnable` and `Pausable` contracts. `Ownable` allows the contract to implement mechanisms which adds token owner (contract deployer) role, he then can pause/unpause contract using `Pausable` contract, user can only transfer tokens when contract is not paused. The contract also supports bot protection from another BP contract which is NOT in our audit scope.

This table lists some properties of the audited Koakuma Token Smart Contract (as of the report writing time).

PROPERTY	VALUE
Name	Koakuma
Symbol	KKMA
Decimals	18
Total Supply	1,000,000,000 ($x10^{18}$) Note: the number of decimals is 18, so the total representation token will be 1,000,000,000 or 1 billion.

Table 2. The Koakuma Token Smart Contract properties

2.2. Findings

During the audit process, the audit team found no vulnerability in the given version of Koakuma Token Smart Contract.

APPENDIX

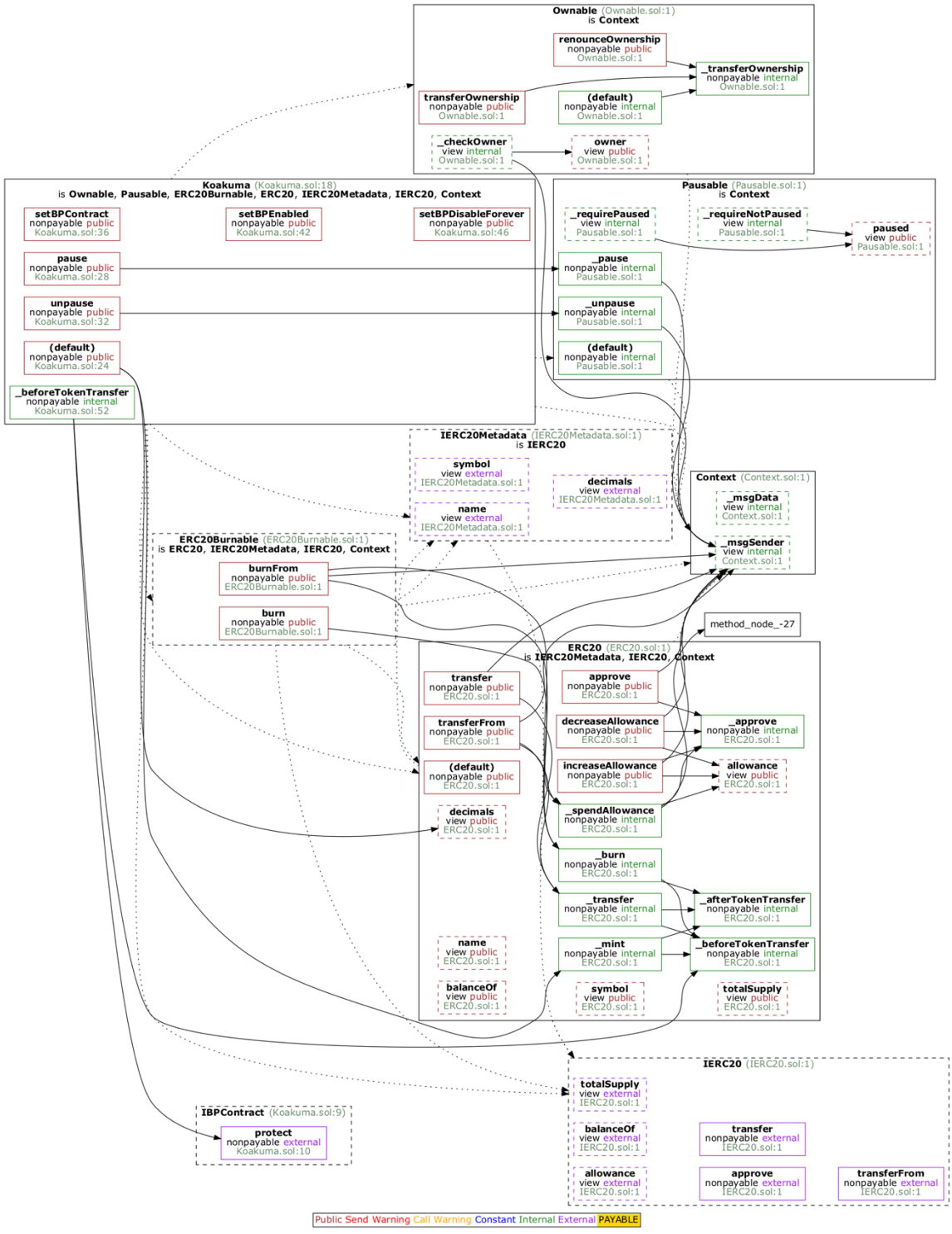

Image 1. Koakuma Token Smart Contract call graph

3. VERSION HISTORY

Version	Date	Status/Change	Created by
1.0	*Jan 15, 2023*	Public Report	Verichains Lab

Table 3. Report versions history