SOLIDProof

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Blockchain Security | Smart Contract Audits | KYC Development | Marketing

MADE IN GERMANY

Modulus Domain

AUDIT

SECURITY ASSESSMENT

21. July, 2023

FOR

MODS.

Modulus Domain Service

Introduction

SolidProof.io is a brand of the officially registered company MAKE Network GmbH, based in Germany. We're mainly focused on Blockchain Security such as Smart Contract Audits and KYC verification for project teams.
Solidproof.io assess potential security issues in the smart contracts implementations, review for potential inconsistencies between the code base and the whitepaper/documentation, and provide suggestions for improvement.

Disclaimer

SolidProof.io reports are not, nor should be considered, an "endorsement" or "disapproval" of any particular project or team. These reports are not, nor should be considered, an indication of the economics or value of any "product" or "asset" created by any team. SolidProof.io do not cover testing or auditing the integration with external contract or services (such as Unicrypt, Uniswap, PancakeSwap etc'...)

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SolidProof.io Reports represent an extensive auditing process intending to help our customers increase the quality of their code while reducing the high level of risk presented by cryptographic tokens and blockchain technology. Blockchain technology and cryptographic assets present a high level of ongoing risk. SolidProof's position is that each company and individual are responsible for their own due diligence and continuous security. SolidProof in no way claims any guarantee of the security or functionality of the technology we agree to analyze.

Project Overview

Summary

Project Name	Modulus Domain
Website	https://modulus.domains/
About the project	MODS allows users to create custom names that are easier to remember and type than traditional cryptocurrency addresses. This makes it more accessible for non-technical users and provides a human-friendly interface to interact with the blockchain.
Chain	Ethereum
Language	Solidity
Codebase Link	https://etherscan.io/address/0xa1ad599f4e45d392f79e4835dd61cd4466eb925e#code https://etherscan.io/address/0x9ee830fb8f824ade830727b01b8e6f6dd7964b62#code
Unit Tests	Provided

Social Medias

Telegram	https://t.me/modulusDSportal
Twitter	https://twitter.com/ModulusDomains
Medium	https://medium.com/@modulusdomains
Instagram	N/A
Github	N/A
Reddit	N/A
LinkedIn	N/A
Discord	N/A
Youtube	N/A
TikTok	N/A

Audit Summary

Version	Delivery Date	Changelog
v1.0	13. July 2023	• Layout Project • Automated- /Manual-Security Testing • Summary
v1.1	21. July 2023	• Reaudit

Note - The following audit report presents a comprehensive security analysis of the smart contract utilized in the project. This analysis did not include functional testing (or unit testing) of the contract/s logic. We cannot guarantee 100% logical correctness of the contract as it was not functionally tested by us.

File Overview

The Team provided us with the files that should be tested in the security assessment. This audit covered the following files listed below with an SHA-1 Hash.

v1.1

File Name	SHA-1 Hash
contracts/MODSMNS.sol	7d51f6c21f8a7e99e69906f70dfd5695a7ec7a4f
contracts/Registry.sol	58ef1848df8771b8b8cc35cd8a6169de574d4800

Please note: Files with a different hash value than in this table have been modified after the security check, either intentionally or unintentionally. A different hash value may (but need not) be an indication of a changed state or potential vulnerability that was not the subject of this scan.

Imported packages

Used code from other Frameworks/Smart Contracts (direct imports).

Dependency / Import Path	Count
@openzeppelin/contracts-upgradeable/access/AccessControlUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/access/OwnableUpgradeable.sol	2
@openzeppelin/contracts-upgradeable/proxy/utils/Initializable.sol	2
@openzeppelin/contracts-upgradeable/proxy/utils/UUPSUpgradeable.sol	2
@openzeppelin/contracts-upgradeable/security/PausableUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/token/ERC20/utils/SafeERC20Upgradeable.sol	1
@openzeppelin/contracts-upgradeable/token/ERC721/ERC721Upgradeable.sol	1
@openzeppelin/contracts-upgradeable/token/ERC721/extensions/ERC721EnumerableUpgradeable.sol	1
@openzeppelin/contracts-upgradeable/utils/CountersUpgradeable.sol	1
@uniswap/v2-periphery/contracts/interfaces/IUniswapV2Router02.sol	1

Note for Investors: We only Audited a Registry and NFT contract for **Modulus Domain**. However, If the project has other contracts (for example, a Presale, ERC20 contract etc), and they were not provided to us in the audit scope, then we cannot comment on its security and are not responsible for it in any way.

External/Public functions

External/public functions are functions that can be called from outside of a contract, i.e., they can be accessed by other contracts or external accounts on the blockchain. These functions are specified using the function declaration's external or public visibility modifier.

State variables

State variables are variables that are stored on the blockchain as part of the contract's state. They are declared at the contract level and can be accessed and modified by any function within the contract. State variables can be defined with a visibility modifier, such as public, private, or internal, which determines the access level of the variable.

Components

📝 Contracts	📚 Libraries	🔍 Interfaces	🎨 Abstract
3	0	0	0

Exposed Functions

This section lists functions that are explicitly declared public or payable. Please note that getter methods for public stateVars are not included.

🌐 Public	💰 Payable
29	3

External	Internal	Private	Pure	View
4	29	0	1	11

StateVariables

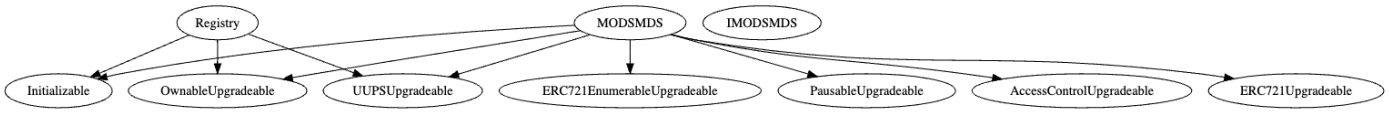
Total	🌐 Public
17	14

Capabilities

Solidity Versions observed	📤 Transfers ETH	💰 Can Receive Funds	🧱 Uses Hash Functions	💣 Has Destroyable Contracts
`0.8.11` `0.8.11`	Yes	Yes	Yes	————

Inheritance Graph

An inheritance graph is a graphical representation of the inheritance hierarchy among contracts. In object-oriented programming, inheritance is a mechanism that allows one class (or contract, in the case of Solidity) to inherit properties and methods from another class. It shows the relationships between different contracts and how they are related to each other through inheritance.



Audit Information

Vulnerability & Risk Level

Risk represents the probability that a certain source threat will exploit vulnerability and the impact of that event on the organization or system. The risk Level is computed based on CVSS version 3.0.

Level	Value	Vulnerability	Risk (Required Action)
Critical	9 - 10	A vulnerability that can disrupt the contract functioning in a number of scenarios, or creates a risk that the contract may be broken.	Immediate action to reduce risk level.
High	7 – 8.9	A vulnerability that affects the desired outcome when using a contract, or provides the opportunity to use a contract in an unintended way.	Implementation of corrective actions as soon aspossible.
Medium	4 – 6.9	A vulnerability that could affect the desired outcome of executing the contract in a specific scenario.	Implementation of corrective actions in a certain period.
Low	2 – 3.9	A vulnerability that does not have a significant impact on possible scenarios for the use of the contract and is probably subjective.	Implementation of certain corrective actions or accepting the risk.
Informational	0 – 1.9	A vulnerability that have informational character but is not effecting any of the code.	An observation that does not determine a level of risk

Auditing Strategy and Techniques Applied

Throughout the review process, care was taken to check the repository for security-related issues, code quality, and compliance with specifications and best practices. To this end, our team of experienced pen-testers and smart contract developers reviewed the code line by line and documented any issues discovered.

We check every file manually. We use automated tools only so that they help us achieve faster and better results.

Methodology

The auditing process follows a routine series of steps:

1. Code review that includes the following:
    a. Reviewing the specifications, sources, and instructions provided to SolidProof to ensure we understand the size, scope, and functionality of the smart contract.
    b. Manual review of the code, i.e., reading the source code line by line to identify potential vulnerabilities.
    c. Comparison to the specification, i.e., verifying that the code does what is described in the specifications, sources, and instructions provided to SolidProof.

2. Testing and automated analysis that includes the following:
    a. Test coverage analysis determines whether test cases cover code and how much code is executed when those test cases are executed.
    b. Symbolic execution, which is analysing a program to determine what inputs cause each part of a program to execute.

3. Review best practices, i.e., review smart contracts to improve efficiency, effectiveness, clarity, maintainability, security, and control based on best practices, recommendations, and research from industry and academia.

4. Concrete, itemized and actionable recommendations to help you secure your smart contracts.

Overall Security

Medium or higher issues

Crucial issue Acknowledged	
Description	The contract does contain issues of medium criticality but the Modulus Team have acknowledge the issue and clarified the issue of Minting as part of their business logic
Comment	We recommend investors do their own research before investing.

Alleviation - The team is aware of a potential flash loan attack because of the external uniswap oracle and they have provided us with the following statement for such an extreme scenario:
"*We are still getting mods price from Uniswap from* ***getModsPriceInUsdc*** *method for 10% discount(mods holder) but now if any attacker uses flash loan on mods price then maximum damage they could do was mint with 10% discount.*"
Moreover, for other scenarios, the functions have been updated and the code from lines 320 to 323, the code is not reachable anymore.

Upgradeability

Contract is an upgradeable	❌ Deployer can update the contract with new functionalities
Description	The deployer can replace the old contract with a new one with new features. Be aware of this, because the owner can add new features that may have a negative impact on your investments.
Comment	N/A

Ownership

The ownership is not renounced	❌ **The owner is not renounce**
Description	The owner has not renounced the ownership that means that the owner retains control over the contract's operations, including the ability to execute functions that may impact the contract's users or stakeholders. This can lead to several potential issues, including: • Centralizations • The owner has significant control over contract's operations
Comment	In the registry contract beware that the owner is able to change the DAI address or more specifically the token address from which the MODS tokens price in USD will be decided. If this address is changed to an unstable coin then the price may fluctuate a lot

Note - If the contract is not deployed then we would consider the ownership to be not renounced. Moreover, if there are no ownership functionalities then the ownership is automatically considered renounced.

Ownership Privileges

These functions can be dangerous. Please note that abuse can lead to financial loss. We have a guide where you can learn more about these Functions.

Minting tokens

Minting tokens refer to the process of creating new tokens in a cryptocurrency or blockchain network. This process is typically performed by the project's owner or designated authority, who has the ability to add new tokens to the network's total supply.

Minter Roles addresses can mint new tokens	❌ **The Minter Address is able to mint new tokens**
Description	The wallets with minter roles who have the ability to mint new NFTs can reward themselves or other stakeholders, who can then sell the newly minted NFTs to raise funds. However, there is a risk that the minter may abuse this power, leading to a decrease in trust and credibility in the project or platform. If stakeholders perceive that the minter is using their power to mint new tokens unfairly or without transparency, it can result in decreased demand for the token and a reduction in its value.
Example	The minter role wallet can mint unlimited NFTs which may affect the price of other NFTs as well because it may disrupt the supply and demand chain.
Comment	We recommend to put a hard cap on the amount of tokens, the owner can mint

Line/s: L86
Codebase -

```
86      function mintTokens(address _to⬆)
87          public
88          whenNotPaused
89          onlyRole(MINTER_ROLE)
90      {
91          uint256 tokenId = _tokenIdCounter.current();
92          _tokenIdCounter.increment();
93          _safeMint(_to⬆, tokenId);
94      }
95
```

MODSMNS.sol

Burning tokens

Burning tokens is the process of permanently destroying a certain number of tokens, reducing the total supply of a cryptocurrency or token. This is usually done to increase the value of the remaining tokens, as the reduced supply can create scarcity and potentially drive up demand.

Contract owner cannot burn tokens	✅ **The owner cannot burn tokens**
Description	The owner is not able burn tokens without any allowances.
Comment	N/A

Blacklist addresses

Blacklisting addresses in smart contracts is the process of adding a certain address to a blacklist, effectively preventing them from accessing or participating in certain functionalities or transactions within the contract. This can be useful in preventing fraudulent or malicious activities, such as hacking attempts or money laundering.

Contract owner cannot blacklist addresses	✅ **The owner cannot blacklist addresses**
Description	The owner is not able blacklist addresses to lock funds.
Comment	N/A

Fees and Tax

In some smart contracts, the owner or creator of the contract can set fees for certain actions or operations within the contract. These fees can be used to cover the cost of running the contract, such as paying for gas fees or compensating the contract's owner for their time and effort in developing and maintaining the contract.

Contract owner cannot set fees more than 25%	✅ **The owner cannot levy unfair taxes**
Description	The owner is not able to set the fees above 25%
Comment	There is no fees or tax functionality

Lock User NFTs

In a smart contract, locking refers to the process of restricting access to certain tokens or assets for a specified period of time. When tokens or assets are locked in a smart contract, they cannot be transferred or used until the lock-up period has expired or certain conditions have been met.

Owner cannot lock the contract	✅ **The owner cannot lock the contract**
Description	Locking the contract means that the owner is able to lock any funds of addresses that they are not able to transfer bought tokens anymore.
Example	An example of locking is by pausing the contract. In this case no Holder will be able to transfer their NFTs
Comment	This functionality was removed in the current version and the owner cannot lock the functionality anymore
Version	1.1

Centralization Privileges

Centralization can arise when one or more parties have privileged access or control over the contract's functionality, data, or decision-making. This can occur, for example, if the contract is controlled by a single entity or if certain participants have special permissions or abilities that others do not.

In the project, there are authorities that have access to the following functions:

File	Privileges
1. Registry.sol	❖ onlyOwner - Update Dislike Symbol - Add/Remove addresses from reserve domains - Update the discount percentage of MODS holders to any arbitrary value - Update MODS NFT and ERC20 Token addresses - Update DAI Token address - Update the price of domain to any arbitrary value - Owner can buy reserved domains that are not already registered. But there are no limitations on how many unique domains owner can buy without paying anything. - Withdraw all the funds from the contract that were generated during the sale
2. MODSMNS.sol	- The owner can update the Base URI - The minter wallet can mint unlimited tokens

Recommendations

To avoid potential hacking risks, it is advisable for the client to manage the private key of the privileged account with care. Additionally, we recommend enhancing the security practices of centralized privileges or roles in the protocol through a decentralized mechanism or smart-contract-based accounts, such as multi-signature wallets.

Here are some suggestions of what the client can do:

- Consider using multi-signature wallets: Multi-signature wallets require multiple parties to sign off on a transaction before it can be executed, providing an extra layer of security e.g. Gnosis Safe
- Use of a timelock at least with a latency of e.g. 48-72 hours for awareness of privileged operations
- Introduce a DAO/Governance/Voting module to increase transparency and user involvement

- Consider Renouncing the ownership so that the owner cannot modify any state variables of the contract anymore. Make sure to set up everything before renouncing.

Audit Results

#1 | Minter Wallet can mint unlimited tokens

File	Severity	Location	Status
MODSMNS.sol	Medium	L86	ACK

Description - The Minter Address can mint unlimited NFTs without any limitation.
Remediation - We recommend putting a hard cap on the maximum amount the Minter role can mint.

#2 | Pauser wallet can lock tokens

File	Severity	Location	Status
MODSMNS.sol	Medium	L73, 77	Fixed

Description - The pauser wallet can pause the transfer functionality in the contract and then no user will be able to transfer their tokens

#3 | Floating Pragma

File	Severity	Location	Status
MODSMNS.sol	Informational	L2	Fixed

Description

- The current pragma Solidity directive is "^0.8.11". Contracts should be deployed with the same compiler version and flag that they have been tested thoroughly. Locking the pragma helps to ensure that contracts do not accidentally get deployed using other versions.

Legend for the Issue Status

Attribute or Symbol	Meaning
Open	The issue is not fixed by the project team.
Fixed	The issue is fixed by the project team.
Acknowledged(ACK)	The issue has been acknowledged or declared as part of business logic.

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