CERTIK

Security Assessment

DODO LimitOrder -Addendum

Jul 6th, 2022

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Summary

This report has been prepared for DODO LimitOrder -Addendum to discover issues and vulnerabilities in the source code of the DODO LimitOrder -Addendum 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.

Additionally, this audit is based on a premise that all external smart contracts, especially `insurance`, `dodoApprove`, and `dodoApproveProxy`, are safely implemented.

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	DODO LimitOrder -Addendum
Platform	Ethereum
Language	Solidity
Codebase	https://github.com/DODOEX/dodo-limit-order/tree/audit/src
Commit	e15c84a0b7ace12cb6750ec36baab4b62a78942c c4fd7e70bffba04aefc038428f2467e2e8450aa8 Deployment address: https://bscscan.com/address/0xbbd59b9316ee65526dbbdec2a748cc05a285d54c#code https://etherscan.io/address/0x628e5081ba93b1c4f58e54e7175088b1ace58852#code

Audit Summary

Delivery Date	Jul 06, 2022 UTC
Audit Methodology	Static Analysis, Manual Review

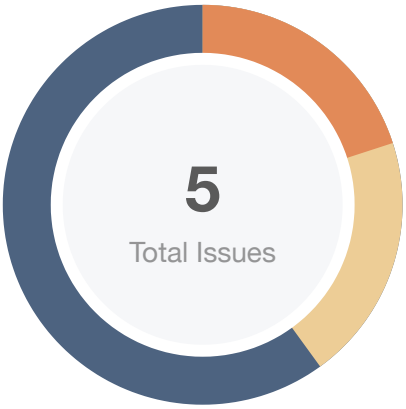
Vulnerability Summary

Vulnerability Level	Total	Pending	Declined	Acknowledged	Mitigated	Partially Resolved	Resolved
Critical	0	0	0	0	0	0	0
Major	1	0	0	1	0	0	0
Medium	0	0	0	0	0	0	0
Minor	1	0	0	1	0	0	0
Informational	3	0	0	1	0	0	2
Discussion	0	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
DOD	DODOGaslessTrading.sol	12691f7fce713501a478b529f73957f97108557e8d37437355b2cfafb551bb82

Findings



Critical	**0** (0.00%)
Major	**1** (20.00%)
Medium	**0** (0.00%)
Minor	**1** (20.00%)
Informational	**3** (60.00%)
Discussion	**0** (0.00%)

ID	Title	Category	Severity	Status
GLOBAL-01	Centralization Related Risks	**Centralization / Privilege**	**Major**	Acknowledged
DOD-01	Missing Input Validation	Volatile Code	Minor	Acknowledged
DOD-02	Boolean Equality	Coding Style	Informational	Resolved
DOD-03	Missing Error Messages	Coding Style	Informational	Resolved
DOD-04	`fromToken` Is Not Enough	Logical Issue	Informational	Acknowledged

GLOBAL-01 | Centralization Related Risks

Category	Severity	Location	Status
Centralization / Privilege	**Major**		Acknowledged

Description

In the contract `DODOGaslessTrading`, the role `admin` has authority over the following functions:

- function matchingRFQByPlatform()

In the contract `DODOGaslessTrading`, the role `owner` has authority over the following functions:

- function addAdmin()
- function removeAdmin()
- function changeInsurance()
- function renounceOwnership()
- function transferOwnership()

Any compromise to the `admin/owner` account may allow a hacker to take advantage of this authority.

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., multi-signature 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

The client gave the following response:

```
Sure, we will use a 2 of 3 multisig wallet as the owner.
```

DOD-01 | Missing Input Validation

Category	Severity	Location	Status
Volatile Code	Minor	DODOGaslessTrading.sol: 75~78	Acknowledged

Description

The given input is missing the check for the non-zero address.

Recommendation

We advise adding the check for the passed-in values to prevent unexpected errors as below:

```
  75  require(address(0) != owner, "set owner to the zero address");
  76  require(address(0) != insurance, "set insurance to the zero address");
  77  require(address(0) != dodoApprove, "set dodo approve to the zero address");
  78  require(address(0) != dodoApproveProxy, "set dodo approve proxy to the zero
address");
  79  _DODO_APPROVE_ = dodoApprove;
  80  _DODO_APPROVE_PROXY_ = dodoApproveProxy;
```

Alleviation

The client gave the following response:

```
We will check the contract states before using in production env.
```

DOD-02 | Boolean Equality

Category	Severity	Location	Status
Coding Style	Informational	DODOGaslessTrading.sol: 97	Resolved

Description

Detects the comparison to boolean constants. Boolean constants can be used directly and do not need to be compare to true or false.

Recommendation

We advise removing the equality to the boolean constant and referring to the following codes:

```
97  require(!_IS_FILLED_[orderHash], "DLOP:ORDER_FILLED");
```

Alleviation

The development team solved this issue at commit c4fd7e70bffba04aefc038428f2467e2e8450aa8.

DOD-03 | Missing Error Messages

Category	Severity	Location	Status
Coding Style	Informational	DODOGaslessTrading.sol: 118	Resolved

Description

The **require** can be used to check for conditions and throw an exception if the condition is not met. It is better to provide a string message containing details about the error that will be passed back to the caller.

Recommendation

We advise refactoring the linked codes as below:

```
118  require(route != _DODO_APPROVE_PROXY_, "route cannot to be dodo approve proxy");
```

Alleviation

The development team solved this issue at commit c4fd7e70bffba04aefc038428f2467e2e8450aa8.

DOD-04 | `fromToken` Is Not Enough

Category	Severity	Location	Status
Logical Issue	Informational	DODOGaslessTrading.sol: 143~159	Acknowledged

Description

Is it possible that both of the `fromToken` and the `toToken` are not enough to pay the compensation?

Recommendation

Please provide us with more information about the design logic.

Alleviation

The client gave the following response:

```
Yes, if neither enough, the transaction will be reverted.
```

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.

Logical Issue

Logical Issue findings detail a fault in the logic of the linked code, such as an incorrect notion on how block.timestamp works.

Volatile Code

Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.

Coding Style

Coding Style findings usually do not affect the generated byte-code but rather comment on how to make the codebase more legible and, as a result, easily maintainable.

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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