CERTIK

Security Assessment

Comtech gold

May 16th, 2022

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Summary

This report has been prepared for Comtech gold to discover issues and vulnerabilities in the source code of the Comtech gold 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	Comtech gold
Platform	XinFin
Language	Solidity
Codebase	https://explorer.xinfin.network/tokens/xdc8f9920283470f52128bf11b0c14e798be704fd15
Commit	

Audit Summary

Delivery Date	May 16, 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	0	0	0	0	0	0	0
Informational	4	0	0	4	0	0	0
Discussion	0	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
GCG	Goldtoken.sol	797773ac085f8c4986c8c54983171f735771586a6c378996ab5411950cf03d2f

Findings

Critical	**0** (0.00%)
Major	**1** (20.00%)
Medium	**0** (0.00%)
Minor	**0** (0.00%)
Informational	**4** (80.00%)
Discussion	**0** (0.00%)

ID	Title	Category	Severity	Status
GCG-01	Centralization Related Risks	**Centralization / Privilege**	**Major**	Acknowledged
GCG-02	Unlocked Compiler Version	Language Specific	Informational	Acknowledged
GCG-03	Redundant Code Components	Volatile Code	Informational	Acknowledged
GCG-04	Improper Usage Of `public` And `external` Type	Gas Optimization	Informational	Acknowledged
GCG-05	Different Solidity Versions	Language Specific	Informational	Acknowledged

GCG-01 | Centralization Related Risks

Category	Severity	Location	Status
Centralization / Privilege	**Major**	Goldtoken.sol: 469, 478, 861, 866	Acknowledged

Description

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

- function renounceOwnership()
- function transferOwnership(address newOwner)

In the contract `Goldtoken`, the role `owner` has the authority to mint tokens to anyone and update black lists over the following functions:

- function mint(address to, uint256 amount)
- function blacklistUpdate(address user, bool value)

Any compromise to the `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., 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

[Team]: The owner is fixed and we are not going to renounce the ownership now to a different address and we have kept the owner's address on the completely offline machine and have taken all the security steps from compromising the owner's address.

GCG-02 | Unlocked Compiler Version

Category	Severity	Location	Status
Language Specific	Informational	Goldtoken.sol: 842	Acknowledged

Description

The contract has unlocked compiler version. An unlocked compiler version in the source code of the contract permits the user to compile it at or above a particular version. This, in turn, leads to differences in the generated bytecode between compilations due to different compiler versions. This can lead to an ambiguity when debugging as compiler specific bugs may occur in the codebase that would be hard to identify over a span of multiple compiler versions rather than a specific one.

Recommendation

We advise that the compiler version is instead locked at the lowest version possible that the contract can be compiled at. For example, for version `v0.6.2` the contract should contain the following line:

```
pragma solidity 0.6.2;
```

Alleviation

[Team]: Issue acknowledged.

GCG-03 | Redundant Code Components

Category	Severity	Location	Status
Volatile Code	Informational	Goldtoken.sol: 409, 773	Acknowledged

Description

The linked statements do not affect the functionality of the codebase and appear to be either leftovers from test code or older functionality.

Recommendation

We advise to remove the redundant statements for production environments.

Alleviation

[Team]: Issue acknowledged. We won't make any changes for the current version.

GCG-04 | Improper Usage Of `public` And `external` Type

Category	Severity	Location	Status
Gas Optimization	Informational	Goldtoken.sol: 478, 590, 602, 621, 638, 656, 675, 815, 830, 861, 866	Acknowledged

Description

`public` functions that are never called by the contract could be declared as `external`. `external` functions are more efficient than `public` functions.

Recommendation

Consider using the external attribute for public functions that are never called within the contract.

Alleviation

[Team]: Issue acknowledged.

GCG-05 | Different Solidity Versions

Category	Severity	Location	Status
Language Specific	Informational	Goldtoken.sol: 6, 150, 312, 392, 419, 489, 798, 842	Acknowledged

Description

Multiple Solidity versions are used in the codebase.

Versions used: `>=0.7.0<0.8.0`, `^0.7.0`

Recommendation

We recommend using one Solidity version.

Alleviation

[Team]: Issue acknowledged.

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.

Gas Optimization

Gas Optimization findings do not affect the functionality of the code but generate different, more optimal EVM opcodes resulting in a reduction on the total gas cost of a transaction.

Volatile Code

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

Language Specific

Language Specific findings are issues that would only arise within Solidity, i.e. incorrect usage of private or delete.

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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