CERTIK

Security Assessment

BUP(Build UP) Project

Jun 6th, 2022

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Summary

This report has been prepared for BUP(Build UP) Project to discover issues and vulnerabilities in the source code of the BUP(Build UP) Project 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	BUP(Build UP) Project
Platform	Polygon
Language	Solidity
Codebase	https://polygonscan.com/token/0xa32bbbd1b91830af32432e2d9c060c0e45f5c981

Audit Summary

Delivery Date	Jun 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	2	0	0	2	0	0	0
● Medium	0	0	0	0	0	0	0
● Minor	0	0	0	0	0	0	0
● Informational	3	0	0	3	0	0	0
● Discussion	0	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
CON	contracts/v6/common/Context. sol	3f51bf02a778b064ae8981d65488d923a45714587b247e316700c4a108fc 3eec
ERC	contracts/v6/token/ERC20.sol	d9afd488a93182fb6551ff8ee0e18bbb37ab45ca8138b9a5ac780eae1de3 882e
IER	contracts/v6/token/IERC20.sol	3a679bde8c09d2f3ca481084b713e221ad03eb2b658063c6d271979a743 7351d
ADD	contracts/v6/utils/Address.sol	7036511aa4a5f91b4354a0829f9519cfeea16e9deca8189fa4cfbe2187b3b d7f
SMN	contracts/v6/utils/SafeMath.sol	012f73be2c1e930a2206d22ea6d22bd20f2ad2d0f7950667b9fcc847d9fe 8762
BUP	contracts/v6/BUP.sol	eac4e7c92c3cfc300168d53978bdc6881de362ea7789c8ef538eaf5f15f9f 79c

Findings

🔴 **Critical**	**0** (0.00%)		
🟠 **Major**	**2** (40.00%)		
🟡 **Medium**	**0** (0.00%)		
🟡 **Minor**	**0** (0.00%)		
🔵 **Informational**	**3** (60.00%)		
🟢 **Discussion**	**0** (0.00%)		

5 Total Issues

ID	Title	Category	Severity	Status
BUP-01	Centralization Risks In BUP.sol	**Centralization / Privilege**	🟠 **Major**	ⓘ Acknowledged
BUP-02	Initial Token Distribution	**Centralization / Privilege**	🟠 **Major**	ⓘ Acknowledged
BUP-03	Too Many Digits	Coding Style	🔵 Informational	ⓘ Acknowledged
V6C-01	Redundant Code Components	Volatile Code	🔵 Informational	ⓘ Acknowledged
V6C-02	Improper Usage Of `public` And `external` Type	Gas Optimization	🔵 Informational	ⓘ Acknowledged

BUP-01 | Centralization Risks In BUP.sol

Category	Severity	Location	Status
Centralization / Privilege	● **Major**	contracts/v6/BUP.sol: 40, 49, 88, 96, 112, 117, 149	ⓘ Acknowledged

Description

In the contract `BUP` the role `owner` has authority over the functions shown in the diagram below. Any compromise to the `owner` account may allow the hacker to take advantage of this authority.
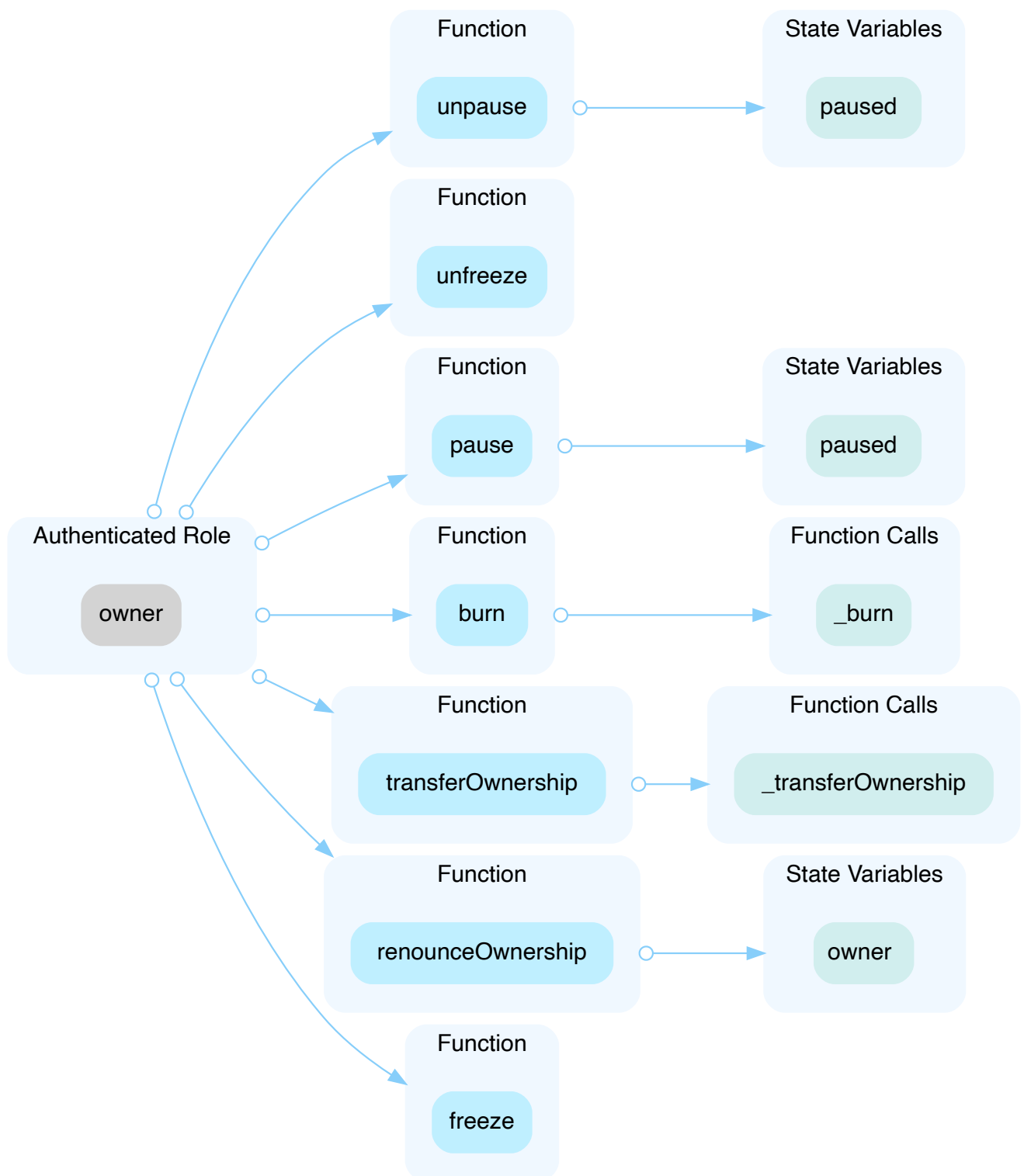
Recommendation

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

From the client: We will use a hard wallet to solve the problem. We are going to distribute tokens as specified in the hard wallet and proceed with the announcement online.

BUP-02 | Initial Token Distribution

Category	Severity	Location	Status
Centralization / Privilege	● **Major**	contracts/v6/BUP.sol: 16	ⓘ Acknowledged

Description

All of the `9900000000` tokens are sent to the contract deployer when deploying the contract. This could be a centralization risk as the deployer can distribute the tokens without obtaining the consensus of the community.

Recommendation

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

Alleviation

From the client: The team members will be clearly identified through linkdin registration. We're going to make the token distribution clear, distribute it in the context, and make a transparent announcement.

BUP-03 | Too Many Digits

Category	Severity	Location	Status
Coding Style	● Informational	contracts/v6/BUP.sol: 16	ⓘ Acknowledged

Description

Literals with many digits are difficult to read and review.

File: contracts/v6/BUP.sol (Line 16, Function `BUP.constructor`)

```
super._mint(msg.sender, 9900000000 * (10**uint256(decimals_)));
```

Recommendation

We advise the client to use the scientific notation to improve readability.

Alleviation

From the client: We tried to make it as legible as possible based on what we needed for our service.

V6C-01 | Redundant Code Components

Category	Severity	Location	Status
Volatile Code	● Informational	contracts/v6/common/Context.sol: 19; contracts/v6/BUP.sol: 7	ⓘ 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

No alleviation.

V6C-02 | Improper Usage Of `public` And `external` Type

Category	Severity	Location	Status
Gas Optimization	● Informational	contracts/v6/BUP.sol: 49, 112, 117, 122, 126, 136, 149; contracts/v6/token/ERC20.sol: 104, 122, 135, 152, 174, 203, 230	ⓘ 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

From the client: It was developed with function in mind that can be used in other contracts in the future.

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.

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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