Security Assessment

BabyDogeRocket

Aug 2nd, 2021

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Summary

This report has been prepared for BabyDogeRocket to discover issues and vulnerabilities in the source code of the BabyDogeRocket 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.
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- 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	BabyDogeRocket
Platform	BSC
Language	Solidity
Codebase	https://bscscan.com/address/0x144bc856e73820b087c3cfd3d74fa67267245b28#code
Commit	

Audit Summary

Delivery Date	Aug 02, 2021
Audit Methodology	Static Analysis, Manual Review
Key Components	

Vulnerability Summary

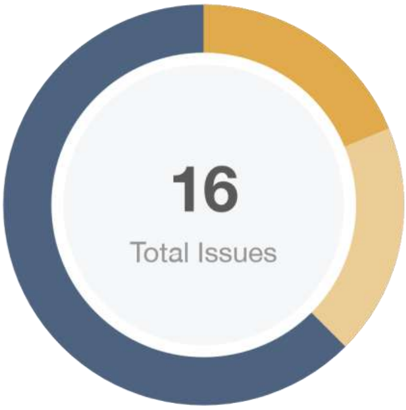
Vulnerability Level	Total
● Critical	0
● Major	0
● Medium	3
● Minor	3
● Informational	10
● Discussion	0

Audit Scope

ID	File	SHA256 Checksum
BAB	BABYDOGEROCKET.sol	bbc886ddc83bd475bc69d8883a75ca6036e879a0a9b9311c09f120b13e987d04
CCK	Context.sol	ade730fe55d7b995a6a9a81f77600d10d9ea7472be54a290a905f853495bce97
DPT	DividendPayingToken.sol	e52de8a5a6d9ce8924e443ef947ea0959145b290779fb40d6155c0858f930282
DPI	DividendPayingTokenInterface.sol	7d7301f0a6321c9a83e2544342327c9eeaffd7476424e60f2f8badd302c94053
DPO	DividendPayingTokenOptionalInterface.sol	613ef8cfcd377b92e0a456548c6560ee3dd18d9a253850fcdd6b9036337feb6b
ERC	ERC20.sol	c9352c9260d5c9261d5c5449cb864887720a316ca241020d5c8a2a0e0c841fb0
IER	IERC20.sol	40b62888fbeb089db2a8060f52214b2aba38abd295b9c6b90fbc8b52ba5158b6
IEC	IERC20Metadata.sol	5453d34cc9db3921a16eb83a551e1a9285d9285806c119d5caf399352f6bf1a6
IUV	IUniswapV2Factory.sol	cfac3b608fe9c5c10db6e7dfbd0e52600689b41848cbb7c3f6d074ebca8b545f

IUP	IUniswapV2Pair.sol	522717b02bc1839e9024e49d6d93ebb976be01a5d0b7e459c3d50fd3dbfe6cb2
IUR	IUniswapV2Router.sol	ac1b9a6719ad80130195805ec526188b3dd3a84ddd5b8e6ac92169abfa415a04
IMC	IterableMapping.sol	4e1661030209caf939a716c3dbc413f704fc7b6d6cdb5a957f1f48e693d30d23
OCK	Ownable.sol	fb7658fc325cceffba19f6cf9809119bf073d1d4cccdbbf9d439a34ff062934c
SMC	SafeMath.sol	253b3928dd6338470c3cc18945de79fa9ec77b12a36948aa36ae3e5771851fba
ID	File	SHA256 Checksum
SMI	SafeMathInt.sol	9345ec14af97a2ed2238153d853257bcd209a8d4de6de8cb1152711bc94402bd
SMU	SafeMathUint.sol	87eae8174207cfb48ac338ad99eeeee1e989ec141144b3b30a2ef90e08d8fb9f

Findings



🟥 **Critical**	**0** (0.00%)
🟧 **Major**	**0** (0.00%)
🟨 **Medium**	**3** (18.75%)
🟨 **Minor**	**3** (18.75%)
🟦 **Informational**	**10** (62.50%)
🟩 **Discussion**	**0** (0.00%)

ID	Title	Category	Severity
BAB-01	Gas optimization in function `_transfer()`	Gas Optimization	● Informational
BAB-02	Privileged Ownership In `BABYROCKETDOGEDividendTracker`	**Centralization / Privilege**	● **Medium**
BAB-03	Privileged Ownership In `BABYROCKETDOGE`	**Centralization / Privilege**	● **Medium**
BAB-04	Proper Usage of “public” and “external” type	Gas Optimization	● Informational
BAB-05	Unchecked Value of ERC-20 `transfer()` Call	Volatile Code	● Minor
BAB-06	Contract gains non-withdrawable BNB via the `swapAndLiquify` function	Logical Issue	● Minor
BAB-07	`Require` Statement Never Pass	Logical Issue	● Informational
BAB-08	`Require` Statement Never Pass in Function `withdrawDividend`	Language Specific	● Informational
BAB-09	Redundant Codes	Logical Issue	● Informational
BAB-10	Extra gas cost	Gas Optimization	● Informational
BAB-11	Nothing to do in `catch` statement	Logical Issue	● Minor
BAB-12	Centralized risk in `swapAndSendToFee`	**Centralization / Privilege**	● **Medium**
DPT-01	`Require` Statement Never Pass	Logical Issue	● Informational

ID	Title	Category	Severity
DPT-02	Lack Of Error Message	Volatile Code	● Informational
DPT-03	Mismatch Between Comment and Code	Coding Style	● Informational
DPT-04	Redundant Codes	Logical Issue	● Informational

BAB-01 Gas optimization in function `_transfer()`

Category	Severity	Location
Gas Optimization	● Informational	BABYROCKETDOGE.sol 283

Description

The calculation `uint256 fees = amount.mul(totalFees).div(100);` can be optimized as below:

```
fees = fees.add(amount.div(100));
```

Recommendation

We recommend optimizing the code to save gas.

BAB-02 Privileged Ownership In `BABYROCKETDOGEDividendTracker`

Category	Severity	Location
Centralization / Privilege	● **Medium**	BABYROCKETDOGE.sol:

Description

1. `excludeFromDividends()`
2. `updateClaimWait()`
3. `setBalance()`
4. `processAccount()`
5. `distributeTokenDividends()`

The owner of contract `BABYROCKETDOGEDividendTracker` has the permission to call functions without obtaining the consensus of the community.

Recommendation

Renounce ownership when it is the right timing, or gradually migrate to a timelock plus multisig governing procedure and let the community monitor in respect of transparency considerations.

The owner of contract `BABYROCKETDOGE` has the permission to call functions without obtaining the consensus of the community

1. `updateDividendTracker()`
2. `updateUniswapV2Router()`
3. `excludeFromFees()`
4. `excludeMultipleAccountsFromFees()`
5. `setMarketingWallet()`
6. `tokenRewardsFee()`
7. `setLiquiditFee()`
8. `setAutomatedMarketMakerPair()`
9. `blacklist()`
10. `excludeFromDividends()`

Recommendation Renounce ownership when it is the right timing, or gradually migrate to a timelock plus multisig governing procedure and let the community monitor in respect of transparency considerations.

BAB-04 | Proper Usage of “public” and “external” type

Category	Severity	Location
Gas Optimization	● Informational	BABYROCKETDOGE.sol

Description

`public` functions that are never called by the contract could be declared `external`. When the inputs are arrays, `external` functions are more efficient than `public` functions.

BAB-05 | Unchecked Value of ERC-20 `transfer()` Call

Category	Severity	Location	Status
Volatile Code	● Minor	BABYROCKETDOGE.sol	ⓘ Acknowledged

Description

"The linked `transfer()` invocations do not check the return value of the function call which should yield a `true` result in case of proper ERC-20 implementation.

The aforementioned lines perform the external call to `transfer` of ERC20 contracts and the return value is not checked in either case. "

Recommendation

"As many tokens do not follow the ERC-20 standard faithfully, they may not return a `bool` variable in this function's execution meaning that simply expecting it can cause incompatibility with these types of tokens. Instead, we advise that OpenZeppelin's `SafeERC20.sol` implementation is utilized for interacting with the `transfer()` and `transferFrom()` functions of ERC-20 tokens. The OZ implementation optionally checks for a return value rendering compatible with all ERC-20 token implementations.

It is recommended to use SafeERC20 or make sure that the value returned from 'transfer()' is checked."

BAB-06 | Contract gains non-withdrawable BNB via the `swapAndLiquify` function

Category	Severity	Location
Logical Issue	● Minor	BABYROCKETDOGE.sol

Description

The `swapAndLiquify` function converts half of the BABYROCKETDOGE tokens to BNB. The other half of BABYROCKETDOGE tokens and part of the converted BNB are deposited into the LP pool on Pancakeswap as liquidity. For every `swapAndLiquify` function call, a small amount of BNB leftover in the contract. This is because the price of BABYROCKETDOGE drops after swapping the first half of BABYROCKETDOGE tokens into BNB s, and the other half of BABYROCKETDOGE tokens require less than the converted BNB to be paired with it when adding liquidity. The contract doesn't appear to provide a way to withdraw those BNB, and they will be locked in the contract forever.

Recommendation

It's not ideal that more and more BNB are locked into the contract over time. The simplest solution is to add a `withdraw` function in the contract to withdraw BNB. Other approaches that benefit the BABYROCKETDOGE token holders can be:

- Distribute BNB to BABYROCKETDOGE token holders proportional to the amount of token they
- hold. Use leftover BNB to buy back BABYROCKETDOGE tokens from the market to increase the price of BABYROCKETDOGE.

BAB-07 | `Require` Statement Never Pass

Category	Severity	Location
Logical Issue	● Informational	BABYROCKETDOGE.sol

Description

The code `require(false)` in the function _`tranfer` will always fail. Is that designed as expected?

BAB-08 | `Require` Statement Never Pass in Function `withdrawDividend`

Category	Severity	Location
Language Specific	● Informational	BABYROCKETDOGE.sol

Description

The code `require(false)` in the function `withdrawDividend` will always fail.

Recommendation

Consider apply the `revert` statement.

BAB-09 | Redundant Codes

Category	Severity	Location
Logical Issue	● Informational	BABYROCKETDOGE.sol

Description

There is no need to declare an address as `payable` if there is no native token transfer on it.

BAB-10 | Extra gas cost

Category	Severity	Location
Gas Optimization	● Informational	BABYROCKETDOGE.sol

Description

There is an extra gas cost in each transfer caused by the extra logic of the distributing of dividend. Is that designed as expected?

BAB-11 | Nothing to do in`catch` statement

Category	Severity	Location
Logical Issue	● Minor	BABYROCKETDOGE.sol

Description

The fail case in try/catch statement is ignored.

DPT-01 | `Require` Statement Never Pass

Category	Severity	Location	Status
Logical Issue	● Informational	DividendPayingToken.sol: 133	✓ Resolved

Description

The code `require(false)` in the function _`tranfer` will never pass.

Recommendation

Consider refactoring the code.

DPT-02 | Lack Of Error Message

Category	Severity	Location
Volatile Code	● Informational	DividendPayingToken.sol

Description

Lack of error messages in the function `distributeDividends` makes it difficult for users to understand.

DPT-03 | Mismatch Between Comment and Code

Category	Severity	Location
Coding Style	● Informational	DividendPayingToken.sol

Description

The comments of the function and its codes are dis-match, the comments described that the function would deal with ether, but its implementation implies that the function deals with the Dividends.

DPT-04 | Redundant Codes

Category	Severity	Location
Logical Issue	● Informational	DividendPayingToken.sol:

Description

There is no need to declare an address as `payable` if there is no native token transfer on it.

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.

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.

Language Specific

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

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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