Cyberscope

Audit Report

Binate Core

April 2023

Network	BSC
Address	0x3d08B97608b73Fa423D52489fD18A5c67d775270
Audited by	© cyberscope

Table of Contents

Review

Contract Name	Binate
Compiler Version	v0.8.0+commit.c7dfd78e
Optimization	200 runs
Explorer	https://bscscan.com/address/0x3d08b97608b73fa423d52489fd18a5c67d775270
Address	0x3d08b97608b73fa423d52489fd18a5c67d775270
Network	BSC
Symbol	BNT
Decimals	18
Total Supply	100,000,000

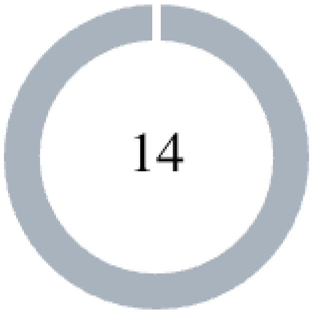
Audit Updates

Initial Audit	22 Apr 2023

Source Files

Filename	SHA256
Binate.sol	3447a35e8074a1a8d1b1ff315857931b086cda2c9ce283e0215c9754fda100f2

Findings Breakdown



Critical	0
Medium	0
Minor / Informative	14

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	0	0	0	0
Medium	0	0	0	0
Minor / Informative	14	0	0	0

Analysis

Critical   Medium   Minor / Informative   Pass

Severity	Code	Description	Status
●	ST	Stops Transactions	Passed
●	OCTD	Transfers Contract's Tokens	Passed
●	OTUT	Transfers User's Tokens	Passed
●	ELFM	Exceeds Fees Limit	Passed
●	ULTW	Transfers Liquidity to Team Wallet	Passed
●	MT	Mints Tokens	Passed
●	BT	Burns Tokens	Passed
●	BC	Blacklists Addresses	Passed

Diagnostics

● Critical ● Medium ● Minor / Informative

Severity	Code	Description	Status
●	CR	Code Repetition	Unresolved
●	RSML	Redundant SafeMath Library	Unresolved
●	RSK	Redundant Storage Keyword	Unresolved
●	IDI	Immutable Declaration Improvement	Unresolved
●	L02	State Variables could be Declared Constant	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L06	Missing Events Access Control	Unresolved
●	L09	Dead Code Elimination	Unresolved
●	L13	Divide before Multiply Operation	Unresolved
●	L14	Uninitialized Variables in Local Scope	Unresolved
●	L15	Local Scope Variable Shadowing	Unresolved
●	L16	Validate Variable Setters	Unresolved
●	L17	Usage of Solidity Assembly	Unresolved
●	L19	Stable Compiler Version	Unresolved

CR - Code Repetition

Criticality	Minor / Informative
Location	Binate.sol#L865,884
Status	Unresolved

Description

The contract contains repetitive code segments. There are potential issues that can arise when using code segments in Solidity. Some of them can lead to issues like gas efficiency, complexity, readability, security, and maintainability of the source code. It is generally a good idea to try to minimize code repetition where possible.

The functions `balanceNetwork` and `reBalance` share identical code, with the only distinction being their visibility. While `balanceNetwork` is declared as an external function, `reBalance` is defined as an internal function. As a result, the same code is duplicated.

```
function reBalance() internal returns (bool _success) {
    require(lastBalancedHour < getCurrentHour(), 'Network already balanced
in this hour');

    lastBalancedHour = getCurrentHour();

    timeOfLastClaim = block.timestamp;

    uint256 _bntBurnt = _burnQuarantined();

    emit BalanceNetwork(getCurrentHour(), _bntBurnt);
    return true;
}
```

Recommendation

The team is advised to avoid repeating the same code in multiple places, which can make the contract easier to read and maintain. The authors could try to reuse code wherever possible, as this can help reduce the complexity and size of the contract. For instance, the contract could either reuse the common code segments in an internal function in order to avoid repeating the same code in multiple places or convert the `balanceNetwork` function's visibility to public and remove the `reBalance` function.

RSML - Redundant SafeMath Library

Criticality	Minor / Informative
Location	Binate.sol
Status	Unresolved

Description

SafeMath is a popular Solidity library that provides a set of functions for performing common arithmetic operations in a way that is resistant to integer overflows and underflows.

Starting with Solidity versions that are greater than or equal to 0.8.0, the arithmetic operations revert to underflow and overflow. As a result, the native functionality of the Solidity operations replaces the SafeMath library. Hence, the usage of the SafeMath library adds complexity, and overhead and increases gas consumption unnecessarily.

```
library SafeMath {...}
```

Recommendation

The team is advised to remove the SafeMath library. Since the version of the contract is greater than `0.8.0` then the pure Solidity arithmetic operations produce the same result.

If the previous functionality is required, then the contract could exploit the `unchecked { ... }` statement.

Read more about the breaking change at https://docs.soliditylang.org/en/v0.8.16/080-breaking-changes.html#solidity-v0-8-0-breaking-changes.

RSK - Redundant Storage Keyword

Criticality	Minor / Informative
Location	Binate.sol#L139,147,151,159,186,197,201,209
Status	Unresolved

Description

The contract uses the `storage` keyword in a view function. The `storage` keyword is used to persist data on the contract's storage. View functions are functions that do not modify the state of the contract and do not perform any actions that cost gas (such as sending a transaction). As a result, the use of the `storage` keyword in view functions is redundant.

```
Set storage set
AddressSet storage set
```

Recommendation

It is generally considered good practice to avoid using the `storage` keyword in view functions because it is unnecessary and can make the code less readable.

IDI - Immutable Declaration Improvement

Criticality	Minor / Informative
Location	Binate.sol#L738,741,749
Status	Unresolved

Description

The contract is using variables that initialize them only in the constructor. The other functions are not mutating the variables. These variables are not defined as `immutable`.

```
dexRouter
lpPair
_initGrowthStartTime
```

Recommendation

By declaring a variable as immutable, the Solidity compiler is able to make certain optimizations. This can reduce the amount of storage and computation required by the contract, and make it more gas-efficient.

L02 - State Variables could be Declared Constant

Criticality	Minor / Informative
Location	Binate.sol#L675,690
Status	Unresolved

Description

State variables can be declared as constant using the constant keyword. This means that the value of the state variable cannot be changed after it has been set. Additionally, the constant variables decrease gas consumption of the corresponding transaction.

```
uint256 public claimFreq = 3600
uint256 distributorGas = 500000
```

Recommendation

Constant state variables can be useful when the contract wants to ensure that the value of a state variable cannot be changed by any function in the contract. This can be useful for storing values that are important to the contract's behavior, such as the contract's address or the maximum number of times a certain function can be called. The team is advised to add the constant keyword to state variables that never change.

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	Binate.sol#L499,570,572,586,681,682,683,684,695,901,942,1106,1160,1165,1171
Status	Unresolved

Description

The Solidity style guide is a set of guidelines for writing clean and consistent Solidity code. Adhering to a style guide can help improve the readability and maintainability of the Solidity code, making it easier for others to understand and work with.

The followings are a few key points from the Solidity style guide:

1. Use camelCase for function and variable names, with the first letter in lowercase (e.g., myVariable, updateCounter).
2. Use PascalCase for contract, struct, and enum names, with the first letter in uppercase (e.g., MyContract, UserStruct, ErrorEnum).
3. Use uppercase for constant variables and enums (e.g., MAX_VALUE, ERROR_CODE).
4. Use indentation to improve readability and structure.
5. Use spaces between operators and after commas.
6. Use comments to explain the purpose and behavior of the code.
7. Keep lines short (around 120 characters) to improve readability.

```
function WETH() external pure returns (address);
function DOMAIN_SEPARATOR() external view returns (bytes32);
function PERMIT_TYPEHASH() external pure returns (bytes32);
function MINIMUM_LIQUIDITY() external pure returns (uint256);
bool public _priceGrowth
uint256 public _initGrowthStartTime
uint256 public _lastGrowthTime
uint256 public _currentPrice
mapping(address => bool) public _isExcludedFromLimits
uint256 _sownAmount
uint256 _bntAmount
bool _flag
address _sownContractAddress
address _distributorContractAddress

...
```

Recommendation

By following the Solidity naming convention guidelines, the codebase increased the readability, maintainability, and makes it easier to work with.

Find more information on the Solidity documentation https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-convention.

L06 - Missing Events Access Control

Criticality	Minor / Informative
Location	Binate.sol#L1162
Status	Unresolved

Description

Events are a way to record and log information about changes or actions that occur within a contract. They are often used to notify external parties or clients about events that have occurred within the contract, such as the transfer of tokens or the completion of a task. There are functions that have no event emitted, so it is difficult to track off-chain changes.

```
sownContract = _sownContractAddress
```

Recommendation

To avoid this issue, it's important to carefully design and implement the events in a contract, and to ensure that all required events are included. It's also a good idea to test the contract to ensure that all events are being properly triggered and logged.

By including all required events in the contract and thoroughly testing the contract's functionality, the contract ensures that it performs as intended and does not have any missing events that could cause issues.

L09 - Dead Code Elimination

Criticality	Minor / Informative
Location	Binate.sol#L106,116,139,147,151,159,169,176,186,197,201,209,410,429
Status	Unresolved

Description

In Solidity, dead code is code that is written in the contract, but is never executed or reached during normal contract execution. Dead code can occur for a variety of reasons, such as:

- Conditional statements that are always false.
- Functions that are never called.
- Unreachable code (e.g., code that follows a return statement).

Dead code can make a contract more difficult to understand and maintain, and can also increase the size of the contract and the cost of deploying and interacting with it.

```
function _add(Set storage set, bytes32 value) private returns (bool) {
        if (!_contains(set, value)) {
            set._values.push(value);
            set._indexes[value] = set._values.length;
            return true;
        } else {
            return false;
        }
    }

...
```

Recommendation

To avoid creating dead code, it's important to carefully consider the logic and flow of the contract and to remove any code that is not needed or that is never executed. This can help improve the clarity and efficiency of the contract.

L13 - Divide before Multiply Operation

Criticality	Minor / Informative
Location	Binate.sol#L835,836,854,1015,1021
Status	Unresolved

Description

It is important to be aware of the order of operations when performing arithmetic calculations. This is especially important when working with large numbers, as the order of operations can affect the final result of the calculation. Performing divisions before multiplications may cause loss of prediction.

```
uint256 _bntToBurn =

((((_quarantined.mul(_currentPrice)).div(PRICE_DECIMALS)).sub(_sownSupply)).mul(PRICE
_DECIMALS))
                .div(_currentPrice)
uint256 forclaiming = _bntToBurn.mul(2).div(100)
```

Recommendation

To avoid this issue, it is recommended to carefully consider the order of operations when performing arithmetic calculations in Solidity. It's generally a good idea to use parentheses to specify the order of operations. The basic rule is that the multiplications should be prior to the divisions.

L14 - Uninitialized Variables in Local Scope

Criticality	Minor / Informative
Location	Binate.sol#L832
Status	Unresolved

Description

Using an uninitialized local variable can lead to unpredictable behavior and potentially cause errors in the contract. It's important to always initialize local variables with appropriate values before using them.

```
uint256 growRate
```

Recommendation

By initializing local variables before using them, the contract ensures that the functions behave as expected and avoid potential issues.

L15 - Local Scope Variable Shadowing

Criticality	Minor / Informative
Location	Binate.sol#L748
Status	Unresolved

Description

Local scope variable shadowing occurs when a local variable with the same name as a variable in an outer scope is declared within a function or code block. When this happens, the local variable "shadows" the outer variable, meaning that it takes precedence over the outer variable within the scope in which it is declared.

```
uint256 totalSupply = 1 * 10e7 * 1e18
```

Recommendation

It's important to be aware of shadowing when working with local variables, as it can lead to confusion and unintended consequences if not used correctly. It's generally a good idea to choose unique names for local variables to avoid shadowing outer variables and causing confusion.

L16 - Validate Variable Setters

Criticality	Minor / Informative
Location	Binate.sol#L468,751
Status	Unresolved

Description

The contract performs operations on variables that have been configured on user-supplied input. These variables are missing of proper check for the case where a value is zero. This can lead to problems when the contract is executed, as certain actions may not be properly handled when the value is zero.

```
_owner = msgSender
sownContract = _sownContract
```

Recommendation

By adding the proper check, the contract will not allow the variables to be configured with zero value. This will ensure that the contract can handle all possible input values and avoid unexpected behavior or errors. Hence, it can help to prevent the contract from being exploited or operating unexpectedly.

L17 - Usage of Solidity Assembly

Criticality	Minor / Informative
Location	Binate.sol#L218
Status	Unresolved

Description

Using assembly can be useful for optimizing code, but it can also be error-prone. It's important to carefully test and debug assembly code to ensure that it is correct and does not contain any errors.

Some common types of errors that can occur when using assembly in Solidity include Syntax, Type, Out-of-bounds, Stack, and Revert.

```
assembly {
            result := store
        }
```

Recommendation

It is recommended to use assembly sparingly and only when necessary, as it can be difficult to read and understand compared to Solidity code.

L19 - Stable Compiler Version

Criticality	Minor / Informative
Location	Binate.sol#L2
Status	Unresolved

Description

The `^` symbol indicates that any version of Solidity that is compatible with the specified version (i.e., any version that is a higher minor or patch version) can be used to compile the contract. The version lock is a mechanism that allows the author to specify a minimum version of the Solidity compiler that must be used to compile the contract code. This is useful because it ensures that the contract will be compiled using a version of the compiler that is known to be compatible with the code.

```
pragma solidity ^0.8.0;
```

Recommendation

The team is advised to lock the pragma to ensure the stability of the codebase. The locked pragma version ensures that the contract will not be deployed with an unexpected version. An unexpected version may produce vulnerabilities and undiscovered bugs. The compiler should be configured to the lowest version that provides all the required functionality for the codebase. As a result, the project will be compiled in a well-tested LTS (Long Term Support) environment.

Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
SafeMath	Library			
	tryAdd	Internal		
	trySub	Internal		
	tryMul	Internal		
	tryDiv	Internal		
	tryMod	Internal		
	add	Internal		
	sub	Internal		
	mul	Internal		
	div	Internal		
	mod	Internal		
	sub	Internal		
	div	Internal		
	mod	Internal		
Context	Implementation			
	_msgSender	Internal		
	_msgData	Internal		

EnumerableSet	Library			
	_add	Private	✓	
	_remove	Private	✓	
	_contains	Private		
	_length	Private		
	_at	Private		
	_values	Private		
	adds	Internal	✓	
	remove	Internal	✓	
	contains	Internal		
	length	Internal		
	at	Internal		
	values	Internal		
IERC20	Interface			
	totalSupply	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
	name	External		-

	symbol	External		-
	decimals	External		-
ERC20	Implementation	Context, IERC20		
		Public	✓	-
	name	Public		-
	symbol	Public		-
	decimals	Public		-
	totalSupply	Public		-
	totalBurnt	Public		-
	balanceOf	Public		-
	transfer	Public	✓	-
	allowance	Public		-
	approve	Public	✓	-
	transferFrom	Public	✓	-
	increaseAllowance	Public	✓	-
	decreaseAllowance	Public	✓	-
	_transfer	Internal	✓	
	_mint	Internal	✓	
	_burn	Internal	✓	
	_burnFrom	Internal	✓	
	_createInitialSupply	Internal	✓	
	_approve	Internal	✓	

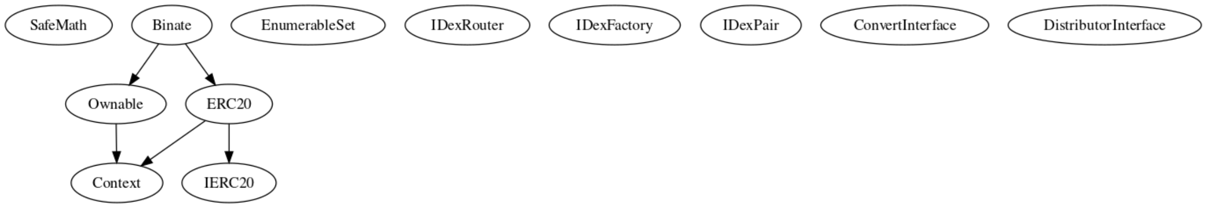
Ownable	Implementation	Context		
		Public	✓	-
	owner	Public		-
	renounceOwnership	External	✓	onlyOwner
	transferOwnership	Public	✓	onlyOwner
IDexRouter	Interface			
	factory	External		-
	WETH	External		-
	swapExactTokensForETHSupportingFeeOnTransferTokens	External	✓	-
	swapExactETHForTokensSupportingFeeOnTransferTokens	External	Payable	-
	addLiquidityETH	External	Payable	-
	getAmountsOut	External		-
IDexFactory	Interface			
	createPair	External	✓	-
IDexPair	Interface			
	name	External		-
	symbol	External		-
	decimals	External		-
	totalSupply	External		-

	balanceOf	External		-
	allowance	External		-
	approve	External	✓	-
	transfer	External	✓	-
	transferFrom	External	✓	-
	DOMAIN_SEPARATOR	External		-
	PERMIT_TYPEHASH	External		-
	nonces	External		-
	permit	External	✓	-
	MINIMUM_LIQUIDITY	External		-
	factory	External		-
	token0	External		-
	token1	External		-
	getReserves	External		-
	price0CumulativeLast	External		-
	price1CumulativeLast	External		-
	kLast	External		-
	mint	External	✓	-
	burn	External	✓	-
	swap	External	✓	-
	skim	External	✓	-
	sync	External	✓	-
	initialize	External	✓	-

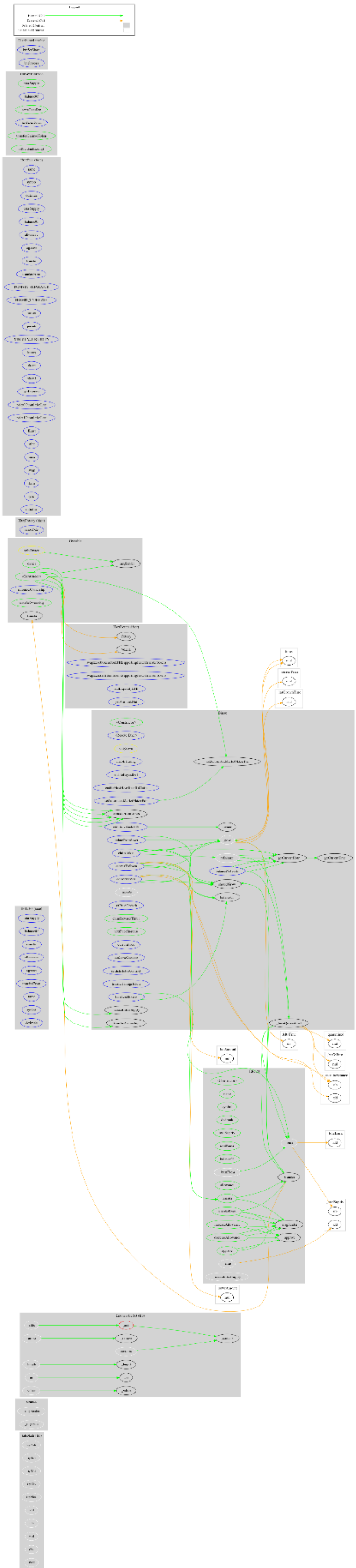
ConvertInterface	Implementation			
	totalSupply	Public		-
	balanceOf	External		-
	sownFromBnt	Public	✓	-
	bntFromSown	External	✓	-
	transferClaimedToken	Public	✓	-
	isDividendExempt	Public		-
DistributorInterface	Implementation			
	bntSetShare	External	✓	-
	bntProcess	External	✓	-
Binate	Implementation	ERC20, Ownable		
		Public	Payable	ERC20
		External	Payable	-
	enableTrading	External	✓	onlyOwner
	enableBuyandSell	External	✓	onlyOwner
	enableMustHaveTokenToClaim	External	✓	onlyOwner
	setAutomatedMarketMakerPair	External	✓	onlyOwner
	_setAutomatedMarketMakerPair	Private	✓	
	excludeFromLimits	Public	✓	onlyOwner
	grow	Internal	✓	

	balanceNetwork	External	✓	-
	reBalance	Internal	✓	
	convertToBnt	External	✓	-
	convertToSown	External	✓	-
	burnLostTokens	External	✓	onlyOwner
	updateFromSown	External	✓	onlySown
	_burnQuarantined	Internal	✓	
	claimToken	External	✓	-
	_transfer	Internal	✓	
	shouldGrow	Internal		
	setPriceGrowth	External	✓	onlyOwner
	claimRewardsTimer	Public		-
	nextPriceIncrease	Public		-
	currentPrice	External		-
	getCurrentTime	Public		-
	getCurrentHour	Public		-
	setSownContract	External	✓	onlyOwner
	setdistributorContract	External	✓	onlyOwner
	transferForeignToken	External	✓	onlyOwner
	withdrawStuckETH	External	✓	onlyOwner

Inheritance Graph



Flow Graph



Summary

Binate Core contract implements a token mechanism. This audit investigates security issues, business logic concerns, and potential improvements. Binate Core is an interesting project that has a friendly and growing community. The Smart Contract analysis reported no compiler errors or critical issues. The contract Owner can access some admin functions that can not be used in a malicious way to disturb the users' transactions.

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Cyberscope is one of the leading smart contract audit firms in the crypto space and has built a high-profile network of clients and partners.

The Cyberscope team

https://www.cyberscope.io