Cyberscope

Audit Report

Bounty Square Ecosystem

February 2023

Type	BEP20
Network	BSC
Address	0x829f85a249161dc0cb45caece3768514527f419b
Audited by	© cyberscope

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Review

Contract Name	BountySquareEcosystem
Compiler Version	v0.8.13+commit.abaa5c0e
Optimization	999 runs
Explorer	https://bscscan.com/address/0x829f85a249161dc0cb45caece3768514527f419b
Address	0x829f85a249161dc0cb45caece3768514527f419b
Network	BSC
Symbol	bset
Decimals	18
Total Supply	100,000,000

Audit Updates

Initial Audit	14 Feb 2023

Source Files

Filename	SHA256
BountySQEcosys.sol	ea6debfbec6ec49443cd38c5175e66fc75ba48911e9e32064277703f6a723742
IBEP20.sol	f1159dce083e1d31ed8a5e55ecece1901dce13b73c1450ab2702df8b81e50868
IDEXFactory.sol	8890bd918e603358e6d17e452e76e71108c384b93fcf2edc5c164a93620358b8
IDEXRouter.sol	50e3bf4e34131c3c19d6f00f8940e59a994796819867973e0eacbec66b5f62a1
MultiSignAuth.sol	1b7c41594b3851a9f1cb0ca3addf58f90c7a755dc438a397a3cbf33d83b74cde
SafeMath.sol	aeec6c10b2cb024953e615b9e05678c3d7e6cb8fe526ae35f738e52879850267

Introduction

Bounty Square Ecosystem implements a BEP20 token functionality enriched with a multisig pattern. This audit focuses on the BountySQEcosys.sol and the MultiSignAuth.sol files, since all the other files are contract from well-known trusted sources.

Analysis

● Critical ● Medium ● Minor / Informative ● Pass

Severity	Code	Description	Status
●	ST	Stops Transactions	Unresolved
●	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	Unresolved
●	BC	Blacklists Addresses	Passed

ST - Stops Transactions

Criticality	Medium
Location	BountySQEcosys.sol#L130
Status	Unresolved

Description

The contract owner has the authority to stop the transactions for all users excluding the owner. The owner may take advantage of it by setting the `isTradeOpened` to false.

```
require(isTradeOpened || isOwner[sender], "Trade still not opened");
```

Recommendation

The contract could embody a check for not allowing setting the _maxTxAmount less than a reasonable amount. A suggested implementation could check that the maximum amount should be more than a fixed percentage of the total supply. The team should carefully manage the private keys of the owner's account. We strongly recommend a powerful security mechanism that will prevent a single user from accessing the contract admin functions. That risk can be prevented by temporarily locking the contract or renouncing ownership.

BT - Burns Tokens

Criticality	Medium
Location	BountySQEcosys.sol#L217
Status	Unresolved

Description

The contract owner has the authority to burn tokens from a specific address. The owner may take advantage of it by calling the `burn` function. As a result, the targeted address will lose the corresponding tokens.

The wallet address that will be burned the tokens is not configured currently. It can only be configured once.

```
function burn(uint256 amount) external override multiSignReq {
    require(_balances[supplyWallet] >= amount, 'Not enough tokens to burn');

    if(multiSign()){
        _transferFrom(supplyWallet, DEAD, amount);
    }
}
```

Recommendation

The team should carefully manage the private keys of the owner's account. We strongly recommend a powerful security mechanism that will prevent a single user from accessing the contract admin functions. That risk can be prevented by temporarily locking the contract or renouncing ownership.

Diagnostics

Critical Medium Minor / Informative

Severity	Code	Description	Status
●	MMF	Misleading Multisig Functionality	Unresolved
●	RSML	Redundant SafeMath Library	Unresolved
●	PTRP	Potential Transfer Revert Propagation	Unresolved
●	DDP	Decimal Division Precision	Unresolved
●	PVC	Price Volatility Concern	Unresolved
●	L02	State Variables could be Declared Constant	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L13	Divide before Multiply Operation	Unresolved
●	L14	Uninitialized Variables in Local Scope	Unresolved
●	L19	Stable Compiler Version	Unresolved
●	L20	Succeeded Transfer Check	Unresolved

MMF - Misleading Multisig Functionality

Criticality	Minor / Informative
Status	Unresolved

Description

The contract implements a multi-sig mechanism for the burn and trade enable functionalities. The minimum number of signers is one. Hence, if one signer is only registered, then it loses the multi-sig purpose.

Recommendation

The team is advised to add a restriction to the minimum number of acceptable signers to run a functional multi-sig wallet. The multi-sig mechanism could also implement a time-locker so the users will be able to track the changes in an acceptable timeframe.

RSML - Redundant SafeMath Library

Criticality	Minor / Informative
Location	BountySQEcosys.sol#L15
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 on 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, overhead and increases unnecessarily the gas consumption.

```
using SafeMath for uint256;
```

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 on https://docs.soliditylang.org/en/v0.8.16/080-breaking-changes.html#solidity-v0-8-0-breaking-changes.

PTRP - Potential Transfer Revert Propagation

Criticality	Minor / Informative
Location	BountySQEcosys.sol#L193
Status	Unresolved

Description

The contract sends funds to a `marketingWallet` as part of the transfer flow. This address can either be a wallet address or a contract. If the address belongs to a contract then it may revert from incoming payment. As a result, the error will propagate to the token's contract and revert the transfer.

```
payable(marketingFeeReceiver).transfer(amountBNBMarketing);
payable(devFeeReceiver).transfer(amountBNBDev);
payable(rewardsFeeReceiver).transfer(amountBNBRewards);
payable(liquidityFeeReceiver).transfer(amountBNBLiquidity);
```

Recommendation

The contract should tolerate the potential revert from the underlying contracts when the interaction is part of the main transfer flow. This could be archived by not allowing set contract addresses or by sending the funds in a non-revertable way.

DDP - Decimal Division Precision

Criticality	Minor / Informative
Location	BountySQEcosys.sol#L188
Status	Unresolved

Description

Division of decimal (fixed point) numbers can result in rounding errors due to the way that division is implemented in Solidity. Thus, it may produce issues with precise calculations with decimal numbers.

Solidity represents decimal numbers as integers, with the decimal point implied by the number of decimal places specified in the type (e.g. decimal with 18 decimal places). When a division is performed with decimal numbers, the result is also represented as an integer, with the decimal point implied by the number of decimal places in the type. This can lead to rounding errors, as the result may not be able to be accurately represented as an integer with the specified number of decimal places.

Hence, the splitted shares will not have the exact precision and some funds may not be calculated as expected.

```
uint256 amountBNBLiquidity = amountBNB.mul(liquidityFee).div(buySellFee);
uint256 amountBNBDev = amountBNB.mul(devFee).div(buySellFee);
uint256 amountBNBMarketing = amountBNB.mul(marketingFee).div(buySellFee);
uint256 amountBNBRewards = amountBNB.mul(rewardsFee).div(buySellFee);
```

Recommendation

The contract could calculate the subtraction of the divided funds in the last calculation in order to avoid the division rounding issue.

PVC - Price Volatility Concern

Criticality	Minor / Informative
Location	BountySQEcosys.sol#L266
Status	Unresolved

Description

The contract accumulates tokens from the taxes to swap them for ETH. The variable `swapTokensAtAmount` sets a threshold where the contract will trigger the swap functionality. If the variable is set to a big number, then the contract will swap a huge amount of tokens for ETH.

It is important to note that the price of the token representing it, can be highly volatile. This means that the value of a price volatility swap involving Ether could fluctuate significantly at the triggered point, potentially leading to significant price volatility for the parties involved.

```
function setSwapBackSettings(bool _enabled, uint256 _threshold, uint256
_pcThresholdMaxSell) external onlyOwners {
    require(pcThresholdMaxSell >= 100, "The _pcThresholdMaxSell has to be 100
or higher");

    swapEnabled = _enabled;
    swapThreshold = _threshold;
    pcThresholdMaxSell = _pcThresholdMaxSell;
}
```

Recommendation

The contract could ensure that it will not sell more than a reasonable amount of tokens in a single transaction. A suggested implementation could check that the maximum amount should be less than a fixed percentage of the total supply. Hence, the contract will guarantee that it cannot accumulate a huge amount of tokens in order to sell them.

L02 - State Variables could be Declared Constant

Criticality	Minor / Informative
Location	BountySQEcosys.sol#L17,18,26,39,40,43,44,45,46
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.

```
address DEAD = 0x000000000000000000000000000000000000dEaD
address ZERO = 0x0000000000000000000000000000000000000000
uint256 public _totalSupply = 100_000_000 * (10 ** _decimals)
uint256 public buySellFee = 250
uint256 public feeDenominator = 10000
uint256 public liquidityFee = 175
uint256 public marketingFee = 25
uint256 public rewardsFee = 25
uint256 public devFee = 25
```

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	MultiSignAuth.sol#L110 BountySQEcosys.sol#L17,18,19,20,22,23,24,26,27,29,30,211,236,256,266,282
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.

```
address[] memory _owners
uint _required

...
```

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.

L13 - Divide before Multiply Operation

Criticality	Minor / Informative
Location	BountySQEcosys.sol#L63
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 public swapThreshold = _totalSupply / 1000 * 3
```

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	MultiSignAuth.sol#L216,231
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.

```
uint count
```

Recommendation

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

L19 - Stable Compiler Version

Criticality	Minor / Informative
Location	MultiSignAuth.sol#L6 BountySQEcosys.sol#L6
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 ^0.8.9;
```

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.

L20 - Succeeded Transfer Check

Criticality	Minor / Informative
Location	BountySQEcosys.sol#L286
Status	Unresolved

Description

According to the ERC20 specification, the transfer methods should be checked if the result is successful. Otherwise, the contract may wrongly assume that the transfer has been established.

```
IBEP20(_token).transfer(msg.sender, _contractBalance)
```

Recommendation

The contract should check if the result of the transfer methods is successful. The team is advised to check the SafeERC20 library from the Openzeppelin library.

Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
BountySquare Ecosystem	Implementation	IBEP20, MultiSignAuth		
		Public	✓	MultiSignAuth
		External	Payable	-
	getCirculatingSupply	Public		-
	totalSupply	External		-
	decimals	External		-
	symbol	External		-
	name	External		-
	getOwner	External		-
	balanceOf	Public		-
	allowance	External		-
	approve	External	✓	-
	approveMax	External	✓	-
	transfer	External	✓	-
	transferFrom	External	✓	-
	_transferFrom	Internal	✓	
	_basicTransfer	Internal	✓	
	shouldTakeFee	Internal		
	takeFee	Internal	✓	
	shouldSwapBack	Internal		
	swapBack	Internal	✓	swapping
	sendFees	Internal	✓	
	openTrade	External	✓	multiSignReq

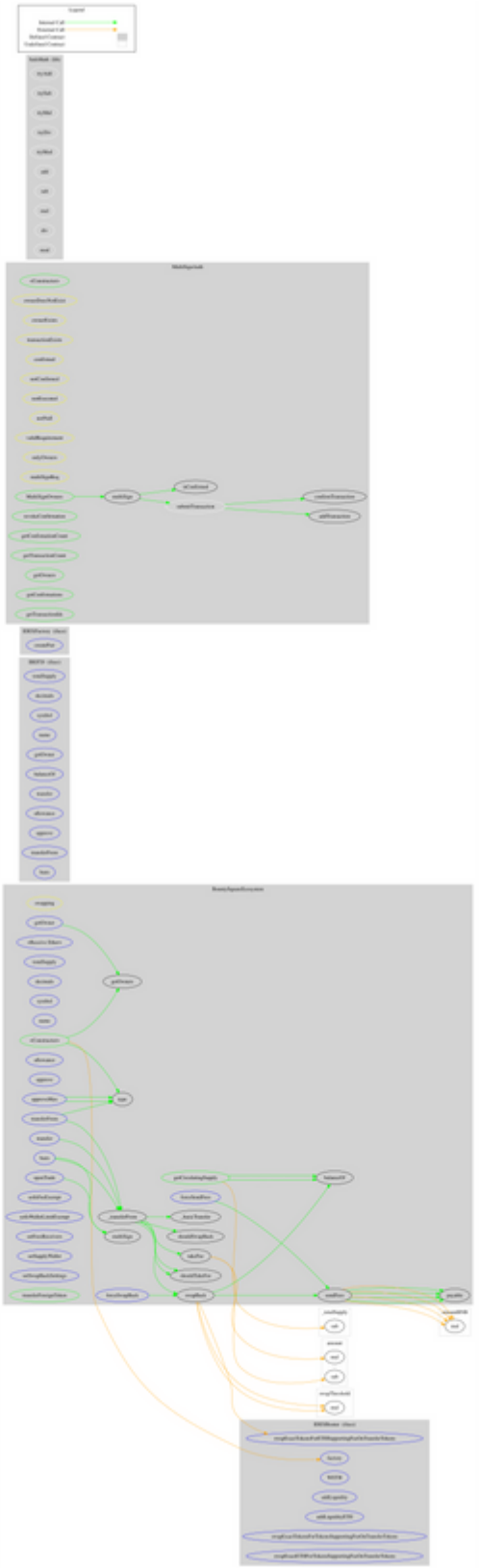
	burn	External	✓	multiSignReq
	setIsFeeExempt	External	✓	onlyOwners
	setIsWalletLimitExempt	External	✓	onlyOwners
	setFeesReceivers	External	✓	onlyOwners
	setSupplyWallet	External	✓	onlyOwners
	setSwapBackSettings	External	✓	onlyOwners
	forceSwapBack	External	✓	onlyOwners
	forceSendFees	External	✓	onlyOwners
	transferForeignToken	Public	✓	onlyOwners
IBEP20	Interface			
	totalSupply	External		-
	decimals	External		-
	symbol	External		-
	name	External		-
	getOwner	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
	burn	External	✓	-
IDEXFactory	Interface			
	createPair	External	✓	-
IDEXRouter	Interface			
	factory	External		-
	WETH	External		-

	addLiquidity	External	✓	-
	addLiquidityETH	External	Payable	-
	swapExactTokensForTokensSupportingFeeOnTransferTokens	External	✓	-
	swapExactETHForTokensSupportingFeeOnTransferTokens	External	Payable	-
	swapExactTokensForETHSupportingFeeOnTransferTokens	External	✓	-
MultiSignAuth	Implementation			
		Public	✓	-
	MultiSignOwners	Public	✓	multiSignReqvalidRequirement
	revokeConfirmation	Public	✓	ownerExists confirmed notExecuted
	addTransaction	Internal	✓	
	confirmTransaction	Internal	✓	ownerExists transactionExists notConfirmed
	submitTransaction	Internal	✓	
	multiSign	Internal	✓	
	getConfirmationCount	Public		-
	getTransactionCount	Public		-
	isConfirmed	Public		-
	getOwners	Public		-
	getConfirmations	Public		-
	getTransactionIds	Public		-
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		

Inheritance Graph

Flow Graph



Summary

There are some functions that can be abused by the owner like stop transactions and burn tokens from one address. The contract implements a build-in multi-sig wallet. Adding a requirement for minimum signers, temporarily locking the contract or renouncing ownership will eliminate all the contract threats.

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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