Cyberscope

Audit Report

The ClubHouse

Staking Tier 2

August 2022

Type	BEP20
Network	BSC
Address	0x837bc373443AC29E3c2124ADB2b3b52cbFc07AB0
Audited by	© cyberscope

Table of Contents

Contract Review

Contract Name	Tier2_TCHStaking
Compiler Version	v0.6.12+commit.27d51765
Optimization	200 runs
Licence	None
Explorer	https://bscscan.com/token/0x837bc373443AC29E3c2124ADB2b3b52cbFc07AB0
Domain	

Source Files

Filename	**SHA256**
contract.sol	5d4bcf9ed6d7a8cc5da482b6abd962068e31cb644d97361207b29eff30564756

Audit Updates

Initial Audit	20th August 2022
Corrected	24th August 2022

Contract Diagnostics

Critical Medium Minor

Severity	Code	Description	Status
	DSM	Data Structure Misuse	Unresolved
	OWCB	Owner Withdraws Contract Balance	Unresolved
	L01	Public Function could be Declared External	Unresolved
	L03	Redundant Statements	Unresolved
	L04	Conformance to Solidity Naming Conventions	Unresolved
	L07	Missing Events Arithmetic	Unresolved
	L09	Dead Code Elimination	Unresolved

DSM - Data Structure Misuse

Criticality	minor
Location	contract.sol#L679
Status	Unresolved

Description

The `userInfo` is defined as a mapping but it uses a singleton structure. The `poolInfo` is defined as an array but it uses a singleton structure.

```
mapping (uint256 => mapping (address => UserInfo)) public userInfo;
PoolInfo[] public poolInfo;
```

Recommendation

The contract could remove the mapping and array structure since it is redundant.

OWCB - Owner Withdraws Contract Balance

Criticality	minor
Location	contract.sol#L739
Status	Unresolved

Description

The contract owner has the authority to withdraw the funds that are indented to operate as the staking rewards. As a result, the users will not be able to unstake.

```
function withdrawTeam(uint256 _amount) public onlyOwner{
    require(_amount<=fundedBalance, 'Not enough tokens.');
    IBEP20(tchToken).safeTransfer(address(msg.sender), _amount);
    fundedBalance = fundedBalance.sub(_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.

L01 - Public Function could be Declared External

Criticality	minor / informative
Location	contract.sol#L587,606,615,729,734,739,768,773,778,817,866,871
Status	Unresolved

Description

Public functions that are never called by the contract should be declared external to save gas.

```
owner
renounceOwnership
transferOwnership
setTokenPerBlock
depositTeam
withdrawTeam
deposit
reDeposit
reLock
...
```

Recommendation

Use the external attribute for functions never called from the contract.

L03 - Redundant Statements

Criticality	minor / informative
Location	contract.sol#L546
Status	Unresolved

Description

The contract contains statements that are not used and have no effect. As a result, those segments increase the code size of the contract unnecessarily.

```
Context
```

Recommendation

Remove the redundant statements in order to decrease the code size.

L04 - Conformance to Solidity Naming Conventions

Criticality	minor / informative
Location	contract.sol#L669,729,734,739,746,751,768,773,778,817,850,875,701,704,705,706,707
Status	Unresolved

Description

Solidity defines a naming convention that should be followed. Rule exceptions:

- Allow constant variable name/symbol/decimals to be lowercase.
- Allow _ at the beginning of the mixed_case match for private variables and unused parameters.

```
Tier2_TCHStaking
_tokenPerBlock
_amount
_from
_to
_pid
_stakeUntil
_user
tchToken
...
```

Recommendation

Follow the Solidity naming convention.
https://docs.soliditylang.org/en/v0.4.25/style-guide.html#naming-conventions.

L07 - Missing Events Arithmetic

Criticality	minor / informative
Location	contract.sol#L729,734,739
Status	Unresolved

Description

Detected missing events for critical arithmetic parameters. There are functions that have no event emitted, so it is difficult to track off-chain changes.

```
tokenPerBlock = _tokenPerBlock
fundedBalance = fundedBalance.add(_amount * (10 ** 9))
fundedBalance = fundedBalance.sub(_amount)
```

Recommendation

Emit an event for critical parameter changes.

L09 - Dead Code Elimination

Criticality	minor / informative
Location	contract.sol#L360,389,403,334,478,503,494,171,176,631,662,651
Status	Unresolved

Description

Functions that are not used in the contract, and make the code's size bigger.

```
functionCall
functionCallWithValue
sendValue
safeApprove
safeDecreaseAllowance
safeIncreaseAllowance
min
sqrt
safeTransferBNB
...
```

Recommendation

Remove unused functions.

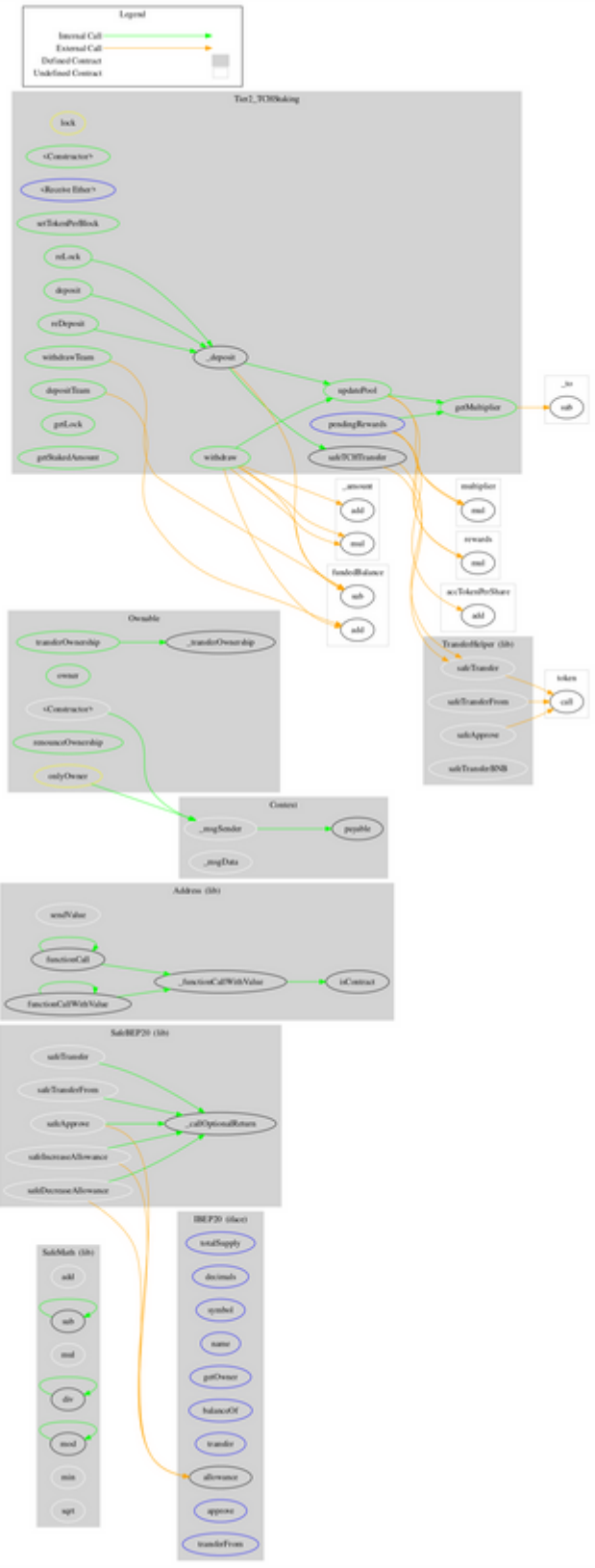
Contract Functions

Contract	Type	Bases		
	Function Name	Visibility	Mutability	Modifiers
SafeMath	Library			
	add	Internal		
	sub	Internal		
	sub	Internal		
	mul	Internal		
	div	Internal		
	div	Internal		
	mod	Internal		
	mod	Internal		
	min	Internal		
	sqrt	Internal		
IBEP20	Interface			
	totalSupply	External		-
	decimals	External		-
	symbol	External		-
	name	External		-
	getOwner	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
Address	Library			
	isContract	Internal		
	sendValue	Internal	✓	
	functionCall	Internal	✓	
	functionCall	Internal	✓	

	functionCallWithValue	Internal	✓	
	functionCallWithValue	Internal	✓	
	_functionCallWithValue	Private	✓	
SafeBEP20	Library			
	safeTransfer	Internal	✓	
	safeTransferFrom	Internal	✓	
	safeApprove	Internal	✓	
	safeIncreaseAllowance	Internal	✓	
	safeDecreaseAllowance	Internal	✓	
	_callOptionalReturn	Private	✓	
Context	Implementation			
	_msgSender	Internal		
	_msgData	Internal		
Ownable	Implementation	Context		
	<Constructor>	Internal	✓	
	owner	Public		-
	renounceOwnership	Public	✓	onlyOwner
	transferOwnership	Public	✓	onlyOwner
	_transferOwnership	Internal	✓	
TransferHelper	Library			
	safeApprove	Internal	✓	
	safeTransfer	Internal	✓	
	safeTransferFrom	Internal	✓	
	safeTransferBNB	Internal	✓	
Tier2_TCHStaking	Implementation	Ownable		
	<Constructor>	Public	✓	-
	<Receive Ether>	External	Payable	-
	setTokenPerBlock	Public	✓	onlyOwner
	depositTeam	Public	✓	onlyOwner

	withdrawTeam	Public	✓	onlyOwner
	getMultiplier	Public		-
	updatePool	Public	✓	-
	deposit	Public	✓	lock
	reDeposit	Public	✓	lock
	reLock	Public	✓	lock
	_deposit	Internal	✓	
	withdraw	Public	✓	lock
	pendingRewards	External		-
	getLock	Public		-
	getStakedAmount	Public		-
	safeTCHTransfer	Internal	✓	

Contract Flow



Summary

The ClubHouse Staking Tier 2 implements a staking functionality. This audit focuses on potential vulnerabilities, business logic concerns and improvements.

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The Cyberscope team

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