Cyberscope

Audit Report

The ClubHouse

Staking Tier 1

August 2022

Type	BEP20
Network	BSC
Address	0x93763A9e98C89df44D82Ca0966Fd989139A05570
Audited by	© cyberscope

Table of Contents

Contract Review

Contract Name	Tier1_TCHStaking
Compiler Version	v0.6.12+commit.27d51765
Optimization	200 runs
Licence	None
Explorer	https://bscscan.com/token/0x93763A9e98C89df44D82Ca0966Fd989139A05570

Source Files

Filename	**SHA256**
contract.sol	7150cd711431849302e59e8be5c74ea2b8c1254eed0c4cf140e85e3e54cb0726

Audit Updates

Initial Audit	20th August 2022
Corrected	

Contract Diagnostics

🔴 Critical 🟠 Medium ⚪ Minor

Severity	Code	Description	Status
🔴	URUF	Users Receive Unlimited Funds	Unresolved
🟠	MAL	Diversified State Between Variables	Unresolved
⚪	DSM	Data Structure Misuse	Unresolved
⚪	OWCB	Owner Withdraws Contract Balance	Unresolved
⚪	L01	Public Function could be Declared External	Unresolved
⚪	L02	State Variables could be Declared Constant	Unresolved
⚪	L03	Redundant Statements	Unresolved
⚪	L04	Conformance to Solidity Naming Conventions	Unresolved
⚪	L07	Missing Events Arithmetic	Unresolved
⚪	L09	Dead Code Elimination	Unresolved

URUF - Users Receive Unlimited Funds

Criticality	critical
Location	contract.sol#L782
Status	Unresolved

Description

The users have the ability to execute the deposit method with zero amount and zero stake time. If a user has already staked, then he receives the “pending” reward. The contract is not keeping track that the “pending” reward has been transferred to the user. As a result, every time that the user executes the deposit method, he will receive rewards until the contract’s balance decreases to zero.

```
function _deposit(uint256 _amount, uint _stakeUntil) internal {

    PoolInfo storage pool = poolInfo[0];
    UserInfo storage user = userInfo[0][msg.sender];
    updatePool(0);

    if ( _stakeUntil != 0) {
        //deposit and relock case
        if(user.stakeUntil>0)require(_stakeUntil >= user.stakeUntil, "Not
possible to shorten the lock.");
        user.stakeUntil = _stakeUntil;
    }
```

Recommendation

The contract could update the rewardDebt variable so that the users will not receive the same rewards.

DSBV - Diversified State Between Variables

Criticality	medium
Location	contract.sol#L795
Status	Unresolved

Description

The `safeTCHTransfer` transfers the contract’s balance instead of the expected amount if the amount is greater than the contract’s balance. This flow produces two issues:

1. The caller of `safeTCHTransfer` is not aware of this. As a result, it assumes that the entire amount has been transferred and it updates the corresponding variables. Hence, the contract’s variables keep a different state compared to reality.

2. The users will not receive the expected amount.

```
uint256 pending =
user.amount.mul(pool.accTokenPerShare).div(1e12).sub(user.rewardDebt);
if(pending > 0) {
    safeTCHTransfer(msg.sender, pending);
}
fundedBalance = fundedBalance.sub(pending);
```

Recommendation

The `safeTCHTransfer` should notify the caller about the actual amount that has been transferred.

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#L738
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
Location	contract.sol#L587,606,615,728,733,738,767,772,777,814,859,864
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.

L02 - State Variables could be Declared Constant

Criticality	minor
Location	contract.sol#L704,705,701,706
Status	Unresolved

Description

Constant state variables should be declared constant to save gas.

```
minimumLockPeriod
poolLimit
tchToken
userLimit
```

Recommendation

Add the constant attribute to state variables that never change.

L03 - Redundant Statements

Criticality	minor
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
Location	contract.sol#L669,728,733,738,745,750,767,772,777,814,843,868
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.

```
Tier1_TCHStaking
_tokenPerBlock
_amount
_from
_to
_pid
_stakeUntil
_user
...
```

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
Location	contract.sol#L728,733,738
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
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.

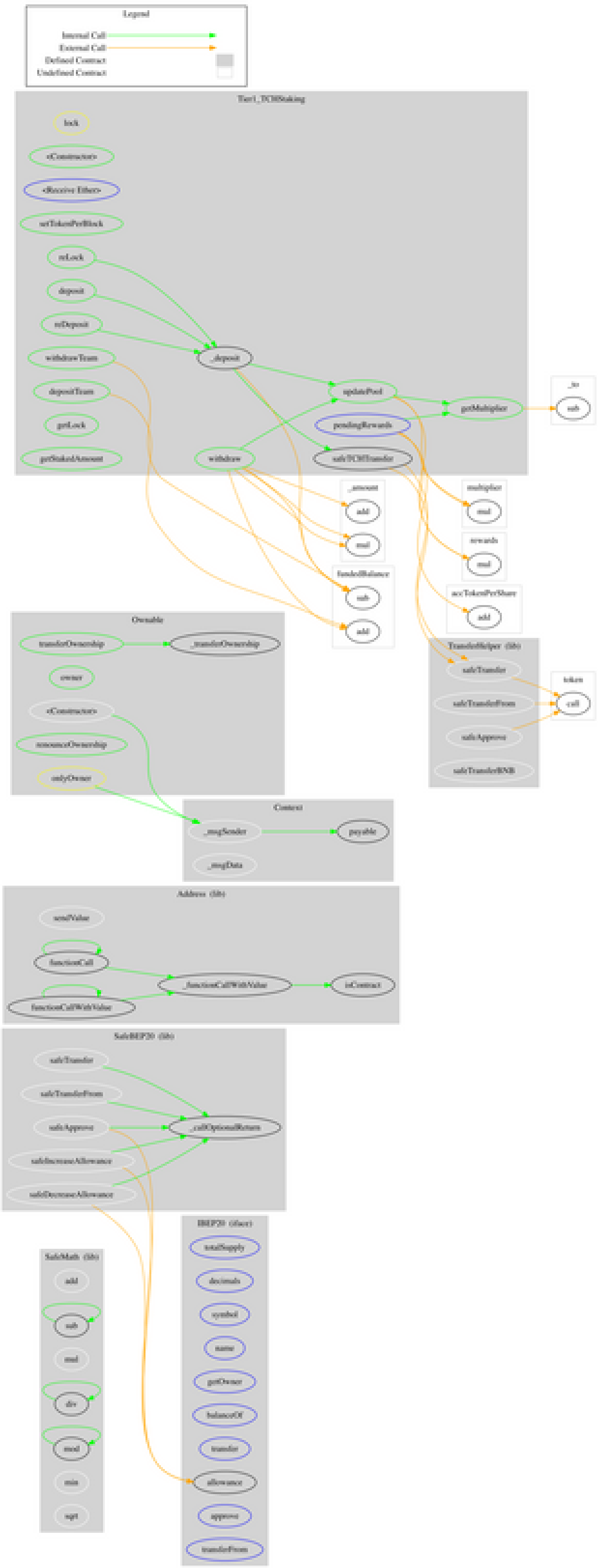
Contract Functions

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	✓	
Tier1_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 1 implements a staking functionality. This audit focuses on potential vulnerabilities, business logic concerns and improvements.

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