



For Healthify
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Smart Contract Security Assessment

Final Report



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The audit report has made all reasonable attempts to provide clear and articulate recommendations to the Project team with respect to the rectification, amendment and/or revision of any highlighted issues, vulnerabilities or exploits within the contracts provided. It is the sole responsibility of the Project team to sufficiently test and perform checks, ensuring that the contracts are functioning as intended, specifically that the functions therein contained within said contracts have the desired intended effects, functionalities and outcomes of the Project team.



1 Overview

This report has been prepared for Healthify on the Binance Smart Chain (BSC). Maxloop provides a user-centred examination of the smart contracts to look for vulnerabilities, logic errors or other issues from both an internal and external perspective.

1.1 Summary

Project Name	Healthify
URL	https://healthland.io/
Platform	Binance Smart Chain
Language	Solidity

1.2 Contracts Assessed

Name	Contract	Live Code Match
Healthify	0x1a8B6E637aAB57c8544DC90BD813c62fAA68AA1C	 MATCH
Healthify.sol/SHA256	bcf6ff597ae036d6d3b90760aa86119735fef199f8bf591c03ba9c68e59ec0dd	 MATCH



Audit Summary

Delivery Date	Mat. 12th, 2021
Method of Audit	Static Analysis, Manual Review
Consultants Engaged	2
Timeline	Mar. 10, 2022 – Mar. 12, 2022

1.3 Findings Summary

Severity	Found	Resolved	Partially Resolved	Acknowledged (no change made)
● High	0	-	-	-
● Medium	0	-	-	-
● Low	3	1	-	2
● Informational	1	-	-	1
Total	4	1	-	3

Classification of Issues

Severity	Description
● High	Exploits, vulnerabilities or errors that will certainly or probabilistically lead towards loss of funds, control, or impairment of the contract and its functions. Issues under this classification are recommended to be fixed with utmost urgency.



● Medium	Bugs or issues with that may be subject to exploit, though their impact is somewhat limited. Issues under this classification are recommended to be fixed as soon as possible.
● Low	Effects are minimal in isolation and do not pose a significant danger to the project or its users. Issues under this classification are recommended to be fixed nonetheless.
● Informational	Consistency, syntax or style best practices. Generally pose a negligible level of risk, if any.

1.3.1 HealthifyToken

ID	Severity Summary	Status
01	<div>LOW</div> Mint function can be used to pre-mint large amounts of tokens before Ownership is transferred to the Masterchef	RESOLVED

1.3.2 HealthifyMasterChef

ID	Severity Summary	Status
01	<div>LOW</div> Inconsistency between deposit fee cap in add and set	ACKNOWLEDGED
02	<div>LOW</div> PendingMondo will show inaccurate pending harvests on the dapp frontend If the pending rewards causes totalSupply to be exceed MAXSUPPLYCAP	ACKNOWLEDGED
03	<div>INFO</div> Total token supply might not be minted due to try and catch pattern	ACKNOWLEDGED



2 Findings

2.1 HealthifyToken

The Healthify token is a simple BEP-20 token which will be used as the main reward token for the Masterchef. The contract allows for Healthify tokens to be minted when the mint function is called by the contract Owner, who at the time of deployment would be the deployer. Ownership is generally transferred to the Masterchef via the transferOwnership function for emission rewards to be minted and distributed to users staking in the Masterchef. The token has a max supply cap of 100,000,000,000.

2.1.1 Token Overview

Address	0x1a8B6E637aAB57c8544DC90BD813c62fAA68AA1C
Token Supply	100,000,000,000
Decimal Places	8
Transfer Max Size	No Maximum
Airdrop	5%
Lock	40%
Wallet Max Size	No Maximum



2.1.2 Privileges

The following functions can be called by the owner of the contract:

- mint
- renounceOwnership
- transferOwnership

2.1.3 Issues & Recommendations

Issue #01

mint function can be used to pre-mint large amounts of tokens before ownership is transferred to the Masterchef

Severity

LOW SEVERITY

Description

The mint function could be used to pre-mint tokens for legitimate uses including, but not limited to, the injection of initial liquidity, token presale, or airdrops; however, this function may also be used to pre-mint and dump tokens when the token contract has been deployed but before ownership is set to the Masterchef contract.

This risk is prevalent amongst less-reputable projects, and any pre-mints can be prominently seen on the Blockchain.

Recommendation

Consider being forthright if this mint function is to be used by letting your community know how much was minted, where they are currently stored, if a vesting contract was used for token unlocking, and finally the purpose of the mints.

Resolution

RESOLVED

1 tokens were pre-minted and ownership has been transferred to the Masterchef.



2.2.1 Privileges

The following functions can be called by the owner of the Masterchef:

- add
- set
- updateEmissionRate
- updateStartTimestamp
- transferOwnership
- renounceOwnership

The following functions can be called by the DevAddr of the Masterchef:

- setDevAddress

The following functions can be called by the FeeAddr of the Masterchef:

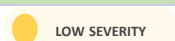
- setFeeAddress

2.2.2 Issues & Recommendations

Issue #02

Inconsistency between deposit fee cap in add and set

Severity



Description

For deposit fees, while add has a max cap of 8%, set has a max cap of 4%.

add: Line 1136 require(_depositFeeBP <= 800, "add: invalid deposit fee basis points");

set: Line 1159 require(_depositFeeBP <= 400, "set: invalid deposit fee basis points");

This behavior is inconsistent, and could allow the owner to add a pool with 8% fee, even if 4% is the expected maximum cap.

Recommendation

The Healthify team should clarify what their maximum cap on the deposit fee is, and ensure that checks in both add and set use the same value. It is encouraged to use the lower value as the cap.


Resolution

ACKNOWLEDGED

Issue #03

pendingHealthify will show inaccurate pending harvests on the dapp frontend if the pending rewards causes totalSupply to be exceed MAXSUPPLYCAP

Severity

 LOW SEVERITY



Location

Similarly to updatePool, pendingHealthify does not check if the pending rewards will cause the total supply to exceed the MAXSUPPLYCAP.

This can cause inaccurate pending harvests to be shown towards the end of token emissions.

Description

Consider factoring in the MAXSUPPLYCAP, and set the pending reward to be the difference between MAXSUPPLYCAP and totalSupply if the pending reward causes totalSupply to exceed MAXSUPPLYCAP.

```
uint256 HealthifyReward =  
multiplier.mul(HealthifyPerBlock).mul(pool.allocPoint).div(total AllocPoint);
```

```
if (Healthify.totalSupply().add(HealthifyReward) >  
Healthify.maxSupply()) { HealthifyReward =  
Healthify.maxSupply().sub(Healthify.totalSupply()); }
```

```
accHealthifyPerShare =  
accHealthifyPerShare.add(HealthifyReward.mul(1e18).div(pool.lpSupply ));
```

Recommendation

pendingHealthify will show inaccurate pending harvests on the dapp frontend if the pending rewards causes totalSupply to be exceed MAXSUPPLYCAP.

Resolution

ACKNOWLEDGED

Issue #04

Total token supply might not be minted due to try and catch pattern



Description

As there is a MAXCAPSUPPLY for the Healthify token, minting the reward and causing the maximum cap to exceed would result in a revert.

```
HealthifyToken::Line 814: require(_totalSupply.add(amount) <=
MAXCAPSUPPLY, "Max supply reached");
```

To prevent this, the following try and catch pattern is done in updatePool.

Line 1209~

```
try Healthify.mint(devaddr, HealthifyReward.div(10)) {
} catch (bytes memory reason) {    HealthifyReward = 0;
    emit HealthifyMintError(reason);
}
```

```
try Healthify.mint(address(this), HealthifyReward) {
} catch (bytes memory reason) {    HealthifyReward = 0;
    emit HealthifyMintError(reason); }
```

In the case where totalSupply + amount does exceed MAXCAPSUPPLY, the mint will not be done. This means that the token supply could be capped at an amount slightly lower than MAXCAPSUPPLY.

Recommendation

Consider minting the difference between MAXCAPSUPPLY and totalSupply, if any.

```
uint256 HealthifyReward =
multiplier.mul(HealthifyPerBlock).mul(pool.allocPoint).div(total AllocPoint);
uint256 devReward = HealthifyReward.div(10); uint256 totalRewards =
Healthify.totalSupply().add(devReward).add(HealthifyReward);
```



```

if (totalRewards <= Healthify.maxSupply()) {
    // mint dev reward as normal as not at maxSupply
    Healthify.mint(devaddr, devReward);
} else {
    // update HealthifyReward to difference
    HealthifyReward= Healthify.maxSupply() - Healthify.totalSupply();
}
if (HealthifyReward != 0) {
    // only mint to MC and calculate and update accHealthifyPerShare if
    // HealthifyReward is non 0
    Healthify.mint(address(this), HealthifyReward);
    pool.accHealthifyPerShare =
    pool.accHealthifyPerShare.add(HealthifyReward.mul(1e18).div(pool.lpSupply));
    pool.lastRewardBlock = block.number;
}

```

Resolution

ACKNOWLEDGED



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