Cyberscope

Audit Report

Ai District

February 2023

Type	BEP20
Network	BSC
Address	0x7e37B487a46d4DFbA47fDd7e4A0723f5Ea7D33C2
Audited by	© cyberscope

Table of Contents

Review

Contract Name	AIDistrict
Compiler Version	v0.8.18+commit.87f61d96
Optimization	200 runs
Explorer	https://bscscan.com/address/0x7e37b487a46d4dfba47fdd7e4a0723f5ea7d33c2
Address	0x7e37b487a46d4dfba47fdd7e4a0723f5ea7d33c2
Network	BSC
Symbol	AID
Decimals	18
Total Supply	1,000,000,000

Audit Updates

Initial Audit	07 Feb 2023

Source Files

Filename	SHA256
AIDistrict.sol	be5e92222ac5ee4b39dc922cb03f13505472b5e797c1724b3d1ca1e5f62dda6e

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	Unresolved
●	MT	Mints Tokens	Passed
●	BT	Burns Tokens	Passed
●	BC	Blacklists Addresses	Passed

ULTW - Transfers Liquidity to Team Wallet

Criticality	Minor / Informative
Location	AIDistrict.sol#L745
Status	Unresolved

Description

The contract owner has the authority to transfer funds without limit to the team wallet. These funds have been accumulated from fees collected from the contract. The owner may take advantage of it by calling the `rescueBNB` method.

```
function rescueBNB(uint256 weiAmount) external onlyOwner {
  payable(owner()).transfer(weiAmount);
}
```

Recommendation

The contract could embody a check for the maximum amount of funds that can be swapped. Since a huge amount may volatile the token's price. 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
●	PTRP	Potential Transfer Revert Propagation	Unresolved
●	DDP	Decimal Division Precision	Unresolved
●	L02	State Variables could be Declared Constant	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L07	Missing Events Arithmetic	Unresolved
●	L13	Divide before Multiply Operation	Unresolved
●	L14	Uninitialized Variables in Local Scope	Unresolved
●	L16	Validate Variable Setters	Unresolved
●	L19	Stable Compiler Version	Unresolved
●	L20	Succeeded Transfer Check	Unresolved

PTRP - Potential Transfer Revert Propagation

Criticality	Minor / Informative
Location	AIDistrict.sol#L618,622
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.

```
if (marketingAmt > 0) {
    payable(marketingWallet).sendValue(marketingAmt);
}

if (treasuryAmt > 0) {
    payable(treasuryWallet).sendValue(treasuryAmt);
}
```

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	AIDistrict.sol#L587
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 deltaBalance = address(this).balance - initialBalance;
uint256 unitBalance = deltaBalance / (denominator -
swapTaxes.liquidity);
uint256 ethToAddLiquidityWith = unitBalance * swapTaxes.liquidity;

if (ethToAddLiquidityWith > 0) {
    // Add liquidity to pancake
    addLiquidity(tokensToAddLiquidityWith, ethToAddLiquidityWith);
}

uint256 marketingAmt = unitBalance * 3 * swapTaxes.marketing;
if (marketingAmt > 0) {
    payable(marketingWallet).sendValue(marketingAmt);
}

uint256 treasuryAmt = unitBalance * 3 * swapTaxes.treasury;
if (treasuryAmt > 0) {
    payable(treasuryWallet).sendValue(treasuryAmt);
}
```

Recommendation

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

L02 - State Variables could be Declared Constant

Criticality	Minor / Informative
Location	AIDistrict.sol#L409
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 private launchtax = 99
```

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	AIDistrict.sol#L62,64,365,407,413,583,664,670,671,672,673,679,680,681,682,693,700,722
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.

```
mapping(address => uint256) internal _balances
mapping(address => mapping(address => uint256)) internal _allowances
function WETH() external pure returns (address);
uint256 public genesis_block
address public constant deadWallet =
0x000000000000000000000000000000000000dEaD

...
```

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.

L07 - Missing Events Arithmetic

Criticality	Minor / Informative
Location	AIDistrict.sol#L667,703,717,736
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.

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.

```
tokenLiquidityThreshold = new_amount * 10**decimals()
deadline = _deadline
coolDownTime = time * 1 seconds
maxBuyLimit = maxBuy * 10**decimals()
```

Recommendation

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 with its arithmetic.

L13 - Divide before Multiply Operation

Criticality	Minor / Informative
Location	AIDistrict.sol#L605,606,613,618
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 unitBalance = deltaBalance / (denominator -
swapTaxes.liquidity)
uint256 marketingAmt = unitBalance * 3 * swapTaxes.marketing
```

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	AIDistrict.sol#L532,533,535
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 feeswap
uint256 feesum
Taxes memory currentTaxes
```

Recommendation

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

L16 - Validate Variable Setters

Criticality	Minor / Informative
Location	AIDistrict.sol#L690
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.

```
pair = newPair
```

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.

L19 - Stable Compiler Version

Criticality	Minor / Informative
Location	AIDistrict.sol#L9
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 ^0.8.18;
```

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	AIDistrict.sol#L747
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(tokenAdd).transfer(owner(), amount)
```

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.

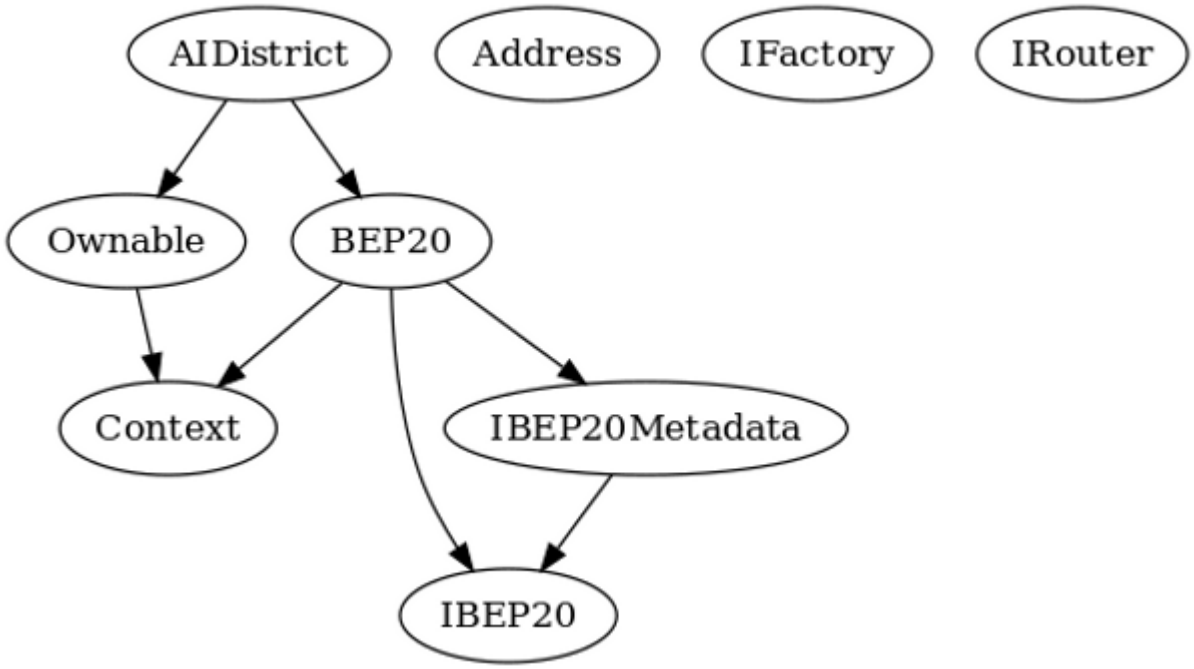
Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
Context	Implementation			
	_msgSender	Internal		
	_msgData	Internal		
IBEP20	Interface			
	totalSupply	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
IBEP20Metadata	Interface	IBEP20		
	name	External		-
	symbol	External		-
	decimals	External		-
BEP20	Implementation	Context, IBEP20, IBEP20Metadata		
		Public	✓	-
	name	Public		-
	symbol	Public		-
	decimals	Public		-

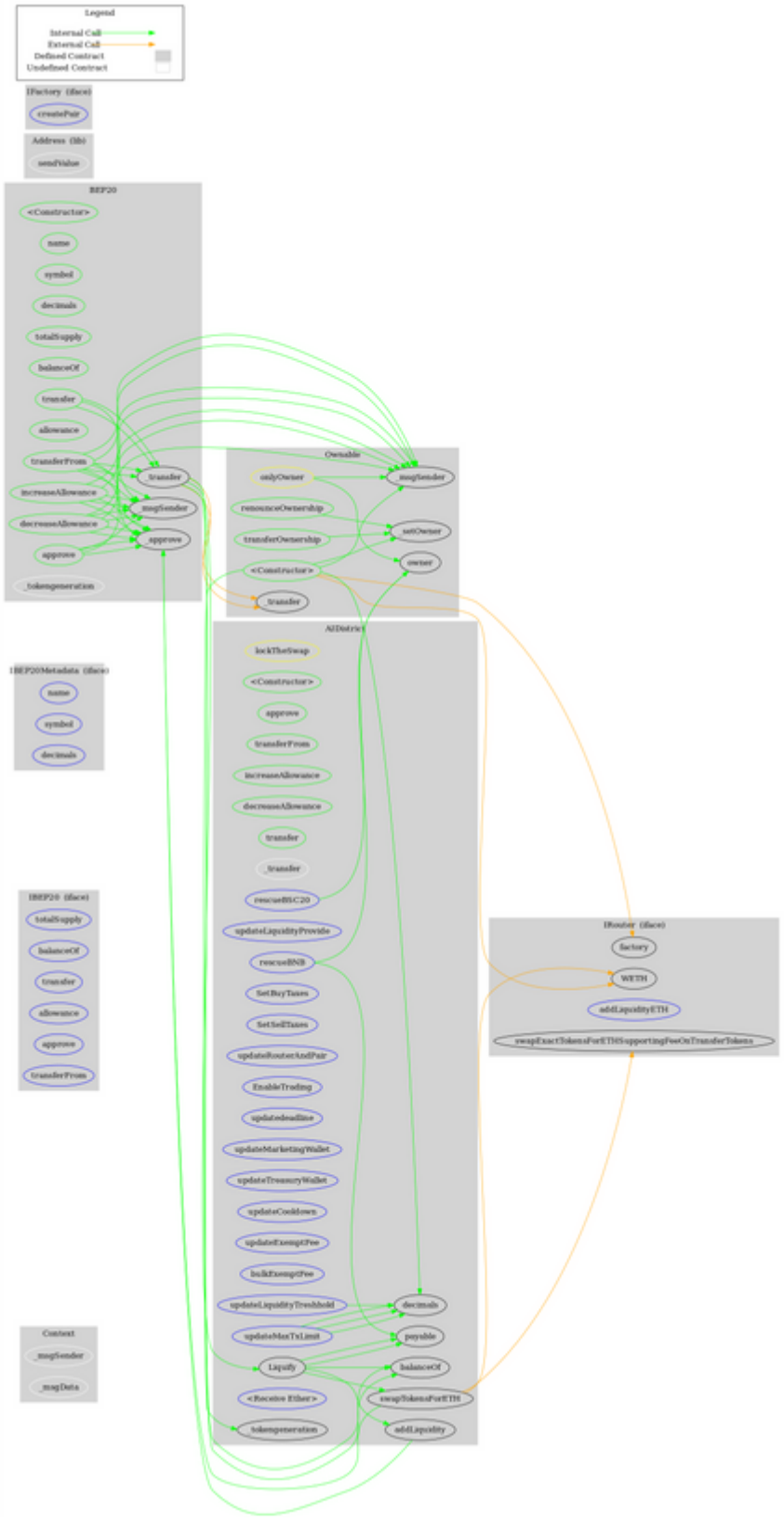
	totalSupply	Public		-
	balanceOf	Public		-
	transfer	Public	✓	-
	allowance	Public		-
	approve	Public	✓	-
	transferFrom	Public	✓	-
	increaseAllowance	Public	✓	-
	decreaseAllowance	Public	✓	-
	_transfer	Internal	✓	
	_tokengeneration	Internal	✓	
	_approve	Internal	✓	
Address	Library			
	sendValue	Internal	✓	
Ownable	Implementation	Context		
		Public	✓	-
	owner	Public		-
	renounceOwnership	Public	✓	onlyOwner
	transferOwnership	Public	✓	onlyOwner
	_setOwner	Private	✓	
IFactory	Interface			
	createPair	External	✓	-
IRouter	Interface			
	factory	External		-
	WETH	External		-
	addLiquidityETH	External	Payable	-

	swapExactTokensForETHSupportingFeeOnTransferTokens	External	✓	-
AIDistrict	Implementation	BEP20, Ownable		
		Public	✓	BEP20
	approve	Public	✓	-
	transferFrom	Public	✓	-
	increaseAllowance	Public	✓	-
	decreaseAllowance	Public	✓	-
	transfer	Public	✓	-
	_transfer	Internal	✓	
	Liquify	Private	✓	lockTheSwap
	swapTokensForETH	Private	✓	
	addLiquidity	Private	✓	
	updateLiquidityProvide	External	✓	onlyOwner
	updateLiquidityTreshhold	External	✓	onlyOwner
	SetBuyTaxes	External	✓	onlyOwner
	SetSellTaxes	External	✓	onlyOwner
	updateRouterAndPair	External	✓	onlyOwner
	EnableTrading	External	✓	onlyOwner
	updatedeadline	External	✓	onlyOwner
	updateMarketingWallet	External	✓	onlyOwner
	updateTreasuryWallet	External	✓	onlyOwner
	updateCooldown	External	✓	onlyOwner
	updateExemptFee	External	✓	onlyOwner
	bulkExemptFee	External	✓	onlyOwner
	updateMaxTxLimit	External	✓	onlyOwner
	rescueBNB	External	✓	onlyOwner
	rescueBSC20	External	✓	onlyOwner
		External	Payable	-

Inheritance Graph



Flow Graph


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
IFactory (iface)
createPair
Address (lib)
sendValue
BEP20
<Constructor>
name
symbol
decimals
totalSupply
balanceOf
transfer
allowance
transferFrom
increaseAllowance
decreaseAllowance
approve
_tokengeneration
_transfer
_msgSender
_approve
Ownable
onlyOwner
renounceOwnership
transferOwnership
<Constructor>
_transfer
_msgSender
_setOwner
owner
AIDistrict
lockTheSwap
<Constructor>
approve
transferFrom
increaseAllowance
decreaseAllowance
transfer
_transfer
rescueBSC20
updateLiquidityProvide
rescueBNB
SetBuyTaxes
SetSellTaxes
updateRouterAndPair
EnableTrading
updatedeadline
updateMarketingWallet
updateTreasuryWallet
updateCooldown
updateExemptFee
bulkExemptFee
updateLiquidityTreshhold
updateMaxTxLimit
Liquify
<Receive Ether>
tokengeneration
decimals
payable
balanceOf
swapTokensForETH
addLiquidity
IBEP20Metadata (iface)
name
symbol
decimals
IBEP20 (iface)
totalSupply
balanceOf
transfer
allowance
approve
transferFrom
Context
_msgSender
_msgData
IRouter (iface)
factory
WETH
addLiquidityETH
swapExactTokensForETHSupportingFeeOnTransferTokens

Summary

There are some functions that can be abused by the owner like transfer funds to the team's wallet. A multi-wallet signing pattern will provide security against potential hacks. Temporarily locking the contract or renouncing ownership will eliminate all the contract threats.The contract utlized a launch tax of 99% and sell cooldown mechanism. There is also a limit of max 4% buy fees and 6% sell fees.

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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