Cyberscope

Audit Report

Bitnium

October 2024

Network	MATIC
Address	0x351251AE8781A5c47b3DFfCc6C0F73A2199ce53A
Audited by	© cyberscope

Analysis

🔴 Critical 🟠 Medium ⚪ Minor / Informative 🔵 Pass

Severity	Code	Description	Status
🔵	ST	Stops Transactions	Passed
🔵	OTUT	Transfers User's Tokens	Passed
🔵	ELFM	Exceeds Fees Limit	Passed
🔵	MT	Mints Tokens	Passed
🔵	BT	Burns Tokens	Passed
🔵	BC	Blacklists Addresses	Passed

Diagnostics

🔴 Critical 🟠 Medium ● Minor / Informative

Severity	Code	Description	Status
●	IDI	Immutable Declaration Improvement	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L05	Unused State Variable	Unresolved
●	L16	Validate Variable Setters	Unresolved

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Risk Classification

The criticality of findings in Cyberscope’s smart contract audits is determined by evaluating multiple variables. The two primary variables are:

1. **Likelihood of Exploitation**: This considers how easily an attack can be executed, including the economic feasibility for an attacker.
2. **Impact of Exploitation**: This assesses the potential consequences of an attack, particularly in terms of the loss of funds or disruption to the contract's functionality.

Based on these variables, findings are categorized into the following severity levels:

1. **Critical**: Indicates a vulnerability that is both highly likely to be exploited and can result in significant fund loss or severe disruption. Immediate action is required to address these issues.
2. **Medium**: Refers to vulnerabilities that are either less likely to be exploited or would have a moderate impact if exploited. These issues should be addressed in due course to ensure overall contract security.
3. **Minor**: Involves vulnerabilities that are unlikely to be exploited and would have a minor impact. These findings should still be considered for resolution to maintain best practices in security.
4. **Informative**: Points out potential improvements or informational notes that do not pose an immediate risk. Addressing these can enhance the overall quality and robustness of the contract.

Severity	Likelihood / Impact of Exploitation
● Critical	Highly Likely / High Impact
● Medium	Less Likely / High Impact or Highly Likely/ Lower Impact
● Minor / Informative	Unlikely / Low to no Impact

Review

Contract Name	Bitnium
Compiler Version	v0.8.17+commit.8df45f5f
Optimization	200 runs
Explorer	https://polygonscan.com/address/0x351251ae8781a5c47b3dffcc6c0f73a2199ce53a
Address	0x351251ae8781a5c47b3dffcc6c0f73a2199ce53a
Network	MATIC
Symbol	BTNM
Decimals	18
Total Supply	21,000,000
Badge Eligibility	Yes

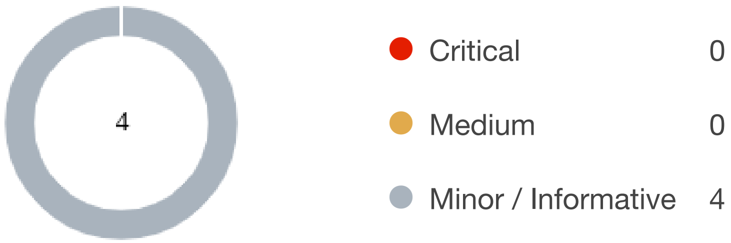
Audit Updates

Initial Audit	23 Oct 2024

Source Files

Filename	SHA256
ReflectiveERC20.sol	8e9820a2678789110e1fbad978c1c86ae642cc129f2b9bcea6766792ccdd02fd
Bitnium.sol	fc90afdaf25ee0c4b895d784c24e21752bee84cae82fea5604b68bd1571162fd

Findings Breakdown



Severity	Unresolved	Acknowledged	Resolved	Other
● Critical	0	0	0	0
● Medium	0	0	0	0
● Minor / Informative	4	0	0	0

IDI - Immutable Declaration Improvement

Criticality	Minor / Informative
Location	Bitnium.sol#L150
Status	Unresolved

Description

The contract declares state variables that their value is initialized once in the constructor and are not modified afterwards. The `immutable` is a special declaration for this kind of state variables that saves gas when it is defined.

```
maxTotalSupply
```

Recommendation

By declaring a variable as immutable, the Solidity compiler is able to make certain optimizations. This can reduce the amount of storage and computation required by the contract, and make it more gas-efficient.

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	ReflectiveERC20.sol#L38,221 Bitnium.sol#L160,266,280,281,300
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.

```
function _tTotal() public view virtual returns (uint256) {
    return totalSupply();
  }
uint256 _amount
address _taxAddress
uint256 _feeBPS
uint256 _taxBPS
uint256 _deflationBPS
```

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/stable/style-guide.html#naming-conventions.

L05 - Unused State Variable

Criticality	Minor / Informative
Location	ReflectiveERC20.sol#L15
Status	Unresolved

Description

An unused state variable is a state variable that is declared in the contract, but is never used in any of the contract's functions. This can happen if the state variable was originally intended to be used, but was later removed or never used.

Unused state variables can create clutter in the contract and make it more difficult to understand and maintain. They can also increase the size of the contract and the cost of deploying and interacting with it.

```
mapping(address => uint256) private _tOwned
```

Recommendation

To avoid creating unused state variables, it's important to carefully consider the state variables that are needed for the contract's functionality, and to remove any that are no longer needed. This can help improve the clarity and efficiency of the contract.

L16 - Validate Variable Setters

Criticality	Minor / Informative
Location	Bitnium.sol#L138,145,292
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.

```
taxAddress = _taxAddress
initialTokenOwner = tokenOwner
```

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.

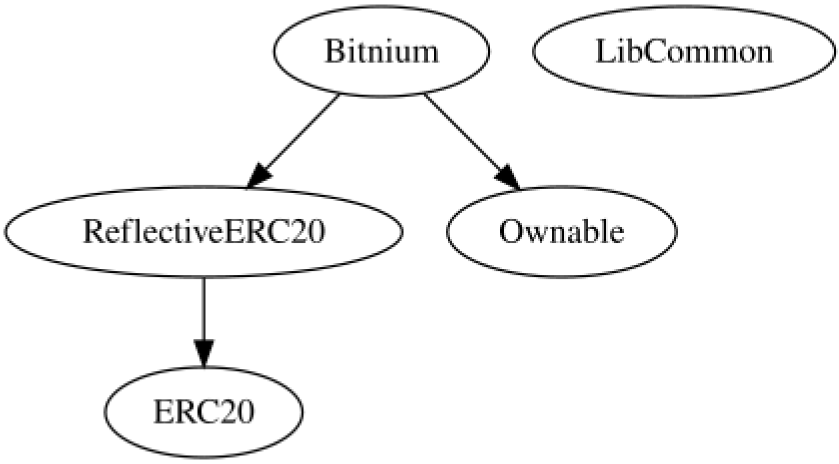
Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
ReflectiveERC20	Implementation	ERC20		
	_tTotal	Public		-
		Public	✓	ERC20
	balanceOf	Public		-
	transferFrom	Public	✓	-
	transfer	Public	✓	-
	_transfer	Internal	✓	
	_mint	Internal	✓	
	_burn	Internal	✓	
	_setReflectionFee	Internal	✓	
	tokenFromReflection	Public		-
	_transferReflected	Private	✓	
	_reflectFee	Private	✓	
	calculateFee	Private		
	_transferNonReflectedTax	Internal	✓	
	_getRValues	Private		
	_getRate	Private		
	_getCurrentSupply	Private		
	_rUpdate	Private	✓	

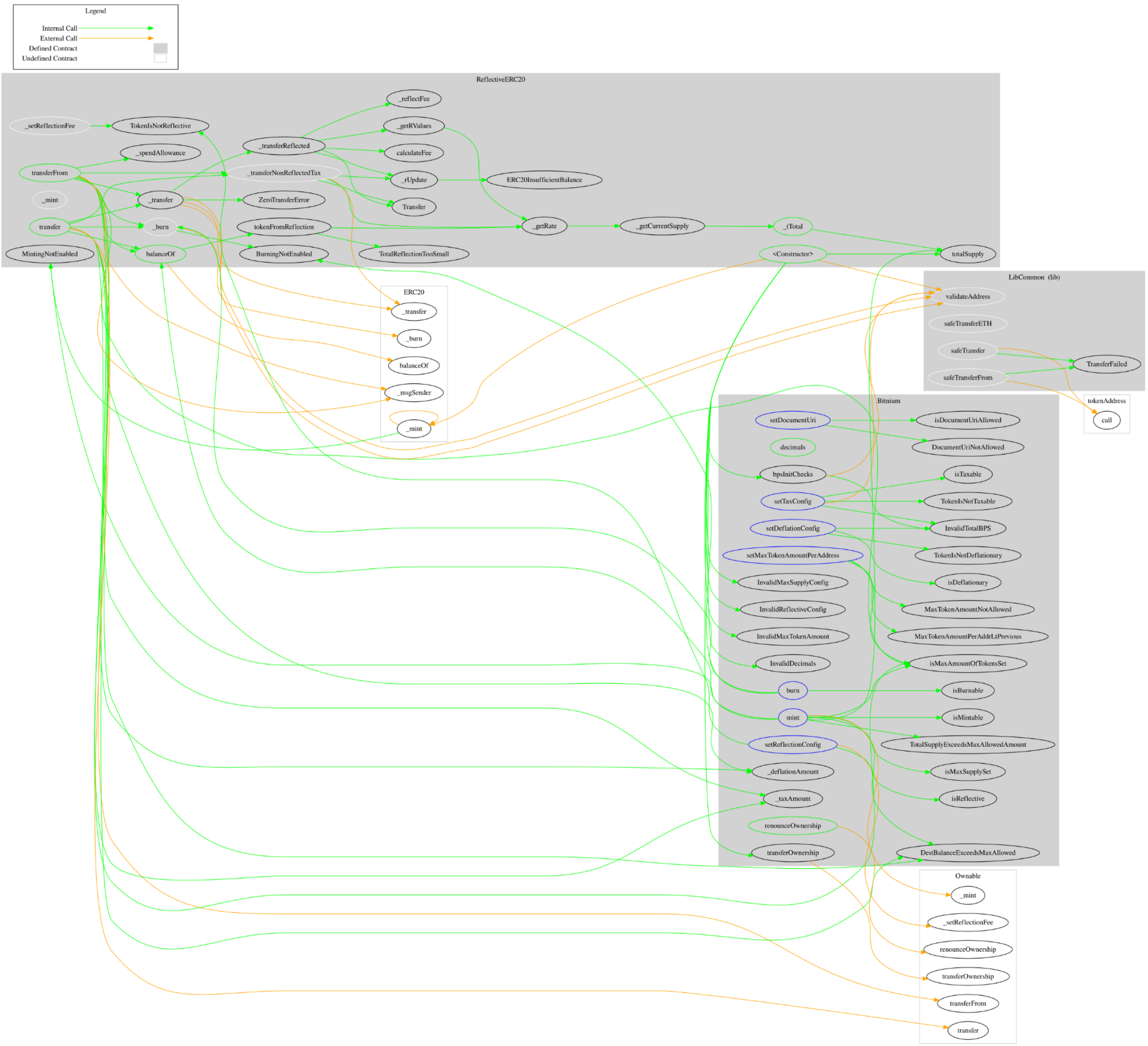
Bitnium	Implementation	ReflectiveERC20, Ownable		
		Public	✓	ReflectiveERC20
	bpsInitChecks	Private		
	isMintable	Public		-
	isBurnable	Public		-
	isMaxAmountOfTokensSet	Public		-
	isMaxSupplySet	Public		-
	isDocumentUriAllowed	Public		-
	decimals	Public		-
	isTaxable	Public		-
	isDeflationary	Public		-
	isReflective	Public		-
	setDocumentUri	External	✓	onlyOwner
	setMaxTokenAmountPerAddress	External	✓	onlyOwner
	setReflectionConfig	External	✓	onlyOwner
	setTaxConfig	External	✓	onlyOwner
	setDeflationConfig	External	✓	onlyOwner
	transfer	Public	✓	-
	transferFrom	Public	✓	-
	mint	External	✓	onlyOwner
	burn	External	✓	onlyOwner
	renounceOwnership	Public	✓	onlyOwner

	transferOwnership	Public	✓	onlyOwner
	_taxAmount	Internal		
	_deflationAmount	Internal		

Inheritance Graph



Flow Graph


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
ReflectiveERC20
_reflectFee
_setReflectionFee
TokenIsNotReflective
_getRValues
_transferReflected
_spendAllowance
calculateFee
transferFrom
_transferNonReflectedTax
_rUpdate
ERC20InsufficientBalance
_mint
_transfer
ZeroTransferError
Transfer
transfer
_burn
tokenFromReflection
_getRate
_getCurrentSupply
_tTotal
MintingNotEnabled
balanceOf
BurningNotEnabled
TotalReflectionTooSmall
<Constructor>
totalSupply
LibCommon (lib)
validateAddress
safeTransferETH
safeTransfer
TransferFailed
safeTransferFrom
tokenAddress
call
ERC20
_transfer
_burn
balanceOf
_msgSender
_mint
Bitnium
setDocumentUri
isDocumentUriAllowed
decimals
DocumentUriNotAllowed
bpsInitChecks
isTaxable
setTaxConfig
TokenIsNotTaxable
setDeflationConfig
InvalidTotalBPS
setMaxTokenAmountPerAddress
TokenIsNotDeflationary
InvalidMaxSupplyConfig
isDeflationary
InvalidReflectiveConfig
MaxTokenAmountNotAllowed
InvalidMaxTokenAmount
MaxTokenAmountPerAddrLtPrevious
InvalidDecimals
isMaxAmountOfTokensSet
burn
isBurnable
mint
isMintable
setReflectionConfig
TotalSupplyExceedsMaxAllowedAmount
_deflationAmount
isMaxSupplySet
_taxAmount
isReflective
renounceOwnership
transferOwnership
DestBalanceExceedsMaxAllowed
Ownable
_mint
_setReflectionFee
renounceOwnership
transferOwnership
transferFrom
transfer

Summary

Bitnium contract implements a token mechanism. This audit investigates security issues, business logic concerns, and potential improvements. Bitnium is an interesting project that has a friendly and growing community. The Smart Contract analysis reported no compiler errors or critical issues. The contract Owner can access some admin functions that can not be used in a malicious way to disturb the users' transactions.

The contract's ownership has been renounced. The information regarding the transaction can be accessed through the following link:

https://polygonscan.com/tx/0xe88513d913f4280a0a933b97bb6468414d3657a371414a12c01e5cd64dea5835

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Blockchain technology and cryptographic assets present a high level of ongoing risk Cyberscope’s position is that each company and individual are responsible for their own due diligence and continuous security Cyberscope’s goal is to help reduce the attack vectors and the high level of variance associated with utilizing new and consistently changing technologies and in no way claims any guarantee of security or functionality of the technology we agree to analyze. The assessment services provided by Cyberscope are subject to dependencies and are under continuing development. You agree that your access and/or use including but not limited to any services reports and materials will be at your sole risk on an as-is where-is and as-available basis Cryptographic tokens are emergent technologies and carry with them high levels of technical risk and uncertainty. The assessment reports could include false positives false negatives and other unpredictable results. The services may access and depend upon multiple layers of third parties.

About Cyberscope

Cyberscope is a blockchain cybersecurity company that was founded with the vision to make web3.0 a safer place for investors and developers. Since its launch, it has worked with thousands of projects and is estimated to have secured tens of millions of investors' funds.

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

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