Cyberscope

Audit Report

INCToken

January 2023

Type	BEP20
Network	BSC
Address	0x787E904093d32d0346f421748C996ad3e34fC8b0
Audited by	© cyberscope

Table of Contents

Review

Contract Name	INCToken
Compiler Version	v0.8.7+commit.e28d00a7
Optimization	200 runs
Explorer	https://polygonscan.com/address/0x07833afe46e945296e842e295dc6fcb329e38899
Address	0x07833afe46e945296e842e295dc6fcb329e38899
Network	MATIC
Symbol	INC
Decimals	18
Total Supply	100,000,000,000

Audit Updates

Initial Audit	30 Jan 2023

Source Files

Filename	SHA256
@openzeppelin/contracts/access/Ownable.sol	9353af89436556f7ba8abb3f37a6677249aa4df6024fbfaa94f79ab2f44f3231
@openzeppelin/contracts/governance/utils/IVotes.sol	55fe90680900ea253e4e5b11d9b6ab5c4ff3e85e48ffb94c8b2c29694d01312b
@openzeppelin/contracts/token/ERC20/ERC20.sol	5031430cc2613c32736d598037d3075985a2a09e61592a013dbd09a5bc2041b8
@openzeppelin/contracts/token/ERC20/extensions/draft-ERC20Permit.sol	d070a08919d4a38aa08043c687d1fe1522098b212d2e185aedf2f37275b64087
@openzeppelin/contracts/token/ERC20/extensions/draft-IERC20Permit.sol	3e7aa0e0f69eec8f097ad664d525e7b3f0a3fda8dcdd97de5433ddb131db86ef
@openzeppelin/contracts/token/ERC20/extensions/ERC20Votes.sol	fb449cd9e8ce63e968e8b5c3d39e64f9928a854fcfa4db33d6a853f890e47fd6
@openzeppelin/contracts/token/ERC20/extensions/IERC20Metadata.sol	af5c8a77965cc82c33b7ff844deb9826166689e55dc037a7f2f790d057811990
@openzeppelin/contracts/token/ERC20/IERC20.sol	94f23e4af51a18c2269b355b8c7cf4db8003d075c9c541019eb8dcf4122864d5
@openzeppelin/contracts/utils/Context.sol	1458c260d010a08e4c20a4a517882259a23a4baa0b5bd9add9fb6d6a1549814a
@openzeppelin/contracts/utils/Counters.sol	2fdcb1343e5621385b62e57b5c7775607c272122b6f2dc77da8f84828aa40cd0
@openzeppelin/contracts/utils/cryptography/draft-EIP712.sol	fc0e6c5d7184bd03b8deae6ca9a48a1eaaecf9f5e4703611aabfb63401e6d43f
@openzeppelin/contracts/utils/cryptography/ECDSA.sol	4e45d53327d561848fbcf381262ec5c0ac91b2f1f06432210bf76db55279d945
@openzeppelin/contracts/utils/math/Math.sol	929523c09910460ad708c75878d89b9fbed12b65cb5d8b670200c793131072f4

@openzeppelin/contracts/utils/math/SafeCast.sol	e44469cf1affcd59005dc9c69df91af9c7b93e6bc4095148232f86ba9e7f749d
@openzeppelin/contracts/utils/Strings.sol	34127ad0054df5963b0fd694c1b313d17e9114a2f426b85526d6d976210298ab
contracts/INCToken.sol	ee1cf83b61da6ae59e05c4d76ef04267dee956f2a72b5860d866a504446d5391

Introduction

The INC Token contract utilizes a timelock smart contract in conjunction with a governance contract. The purpose of the timelock is to delay the execution of certain functions until a predetermined amount of time has passed. The predetermined time is set to 2 days and it can be updated.

Contract Name	Explorer
TimelockController	https://polygonscan.com/address/0xca0fc4ee85b8aff05dac6510a1d3452e7d8c56ea
INCGovernor	https://polygonscan.com/address/0x9a342e71abEab4B9F47Daf520D4C8df3bE938153

The TimelockController is self-governed since the TIMELOCK_ADMIN_ROLE role is given to the contract itself. As the following events depict

Event	Purpose	Tx Hash Explorer
RoleGranted	Grant TIMELOCK_ADMIN_ROLE to deployer	https://polygonscan.com/tx/0x4434c595d3ad2aefc9e0b412969f67f79b251e624a6d629998cc9a3ad2fa39c0#eventlog
RoleGranted	Grant TIMELOCK_ADMIN_ROLE to contract itself	https://polygonscan.com/tx/0x4434c595d3ad2aefc9e0b412969f67f79b251e624a6d629998cc9a3ad2fa39c0
RoleGranted	Grant EXECUTOR_ROLE to the creator	https://polygonscan.com/tx/0x4434c595d3ad2aefc9e0b412969f67f79b251e624a6d629998cc9a3ad2fa39c0

RoleGranted	Grant PROPOSER_ROLE to Governance Contract	https://polygonscan.com/tx/0xbc8ad8356df2854a2d9afcb477e44b649321a0e5d3cae9f790f5bfbc47868063
RoleRevoked	Revoke TIMELOCK_ADMIN_ROLE from creator	https://polygonscan.com/tx/0x14bb7014800fc1ceba000da5b4818d802c146b878e1c2bf710bf67319b83deda

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	Passed
⚪	MT	Mints Tokens	Passed
🔵	BT	Burns Tokens	Passed
🔵	BC	Blacklists Addresses	Passed

MT - Mints Tokens

Criticality	Minor / Informative
Location	contracts/INCToken.sol#L32
Status	Passed

Description

The INC Governor contract has the ability to mint 10% of the total supply annually by invoking the mint function. This leads to a significant increase in the number of contract tokens.

```
function mint(address to, uint256 amount) external onlyOwner {
  require(
    amount <= (totalSupply() * mintCapacity) / 100,
    "INCToken: mint exceeds maximum amount"
  );
  require(block.timestamp >= nextMint, "INCToken: cannot mint yet");

  nextMint = block.timestamp + mintInterval;
  _mint(to, amount);
}
```

Recommendation

The users should exercise caution when voting in a Governor contract. The votes has the potential to impact the behavior and operations of the underlying smart contract. It is essential to thoroughly understand the implications of the vote, including any potential consequences for the stability and security of the contract.

Diagnostics

● Critical ● Medium ● Minor / Informative

Severity	Code	Description	Status
●	L15	Local Scope Variable Shadowing	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L09	Dead Code Elimination	Unresolved
●	L19	Stable Compiler Version	Unresolved

L15 - Local Scope Variable Shadowing

Criticality	Minor / Informative
Location	contracts/INCToken.sol#L21
Status	Unresolved

Description

Local scope variable shadowing occurs when a local variable with the same name as a variable in an outer scope is declared within a function or code block. When this happens, the local variable "shadows" the outer variable, meaning that it takes precedence over the outer variable within the scope in which it is declared.

```
nt256 totalSupply
```

Recommendation

It's important to be aware of shadowing when working with local variables, as it can lead to confusion and unintended consequences if not used correctly. It's generally a good idea to choose unique names for local variables to avoid shadowing outer variables and causing confusion.

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	contracts/INCToken.sol#L17,18
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.

```
nt256 public constant mintInterval = 365 days;

nt256 public constant mintCapacity = 10;
```

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.

L09 - Dead Code Elimination

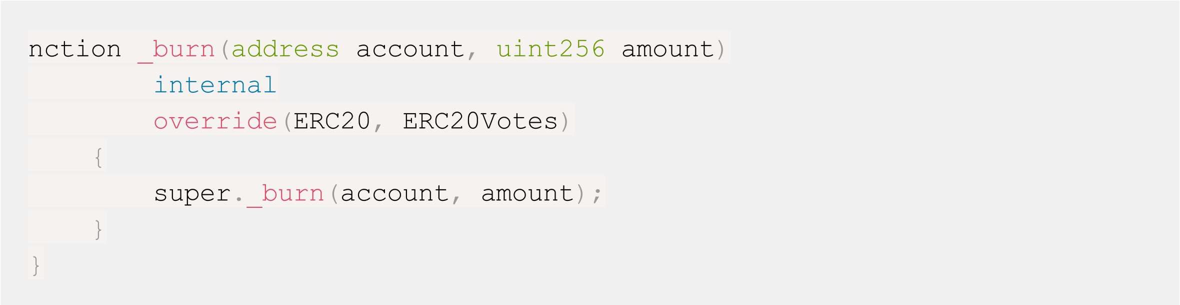
Criticality	Minor / Informative
Location	contracts/INCToken.sol#L55
Status	Unresolved

Description

In Solidity, dead code is code that is written in the contract, but is never executed or reached during normal contract execution. Dead code can occur for a variety of reasons, such as:

- Conditional statements that are always false.
- Functions that are never called.
- Unreachable code (e.g., code that follows a return statement).

Dead code can make a contract more difficult to understand and maintain, and can also increase the size of the contract and the cost of deploying and interacting with it.



```
nction _burn(address account, uint256 amount)
        internal
        override(ERC20, ERC20Votes)
    {
        super._burn(account, amount);
    }
}
```

Recommendation

To avoid creating dead code, it's important to carefully consider the logic and flow of the contract and to remove any code that is not needed or that is never executed. This can help improve the clarity and efficiency of the contract.

L19 - Stable Compiler Version

Criticality	Minor / Informative
Location	contracts/INCToken.sol#L2
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 ^0.8.0;
```

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.

Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
Ownable	Implementation	Context		
		Public	✓	-
	owner	Public		-
	_checkOwner	Internal		
	renounceOwnership	Public	✓	onlyOwner
	transferOwnership	Public	✓	onlyOwner
	_transferOwnership	Internal	✓	
IVotes	Interface			
	getVotes	External		-
	getPastVotes	External		-
	getPastTotalSupply	External		-
	delegates	External		-
	delegate	External	✓	-
	delegateBySig	External	✓	-
ERC20	Implementation	Context, IERC20, IERC20Metadata		
		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	✓	
	_mint	Internal	✓	
	_burn	Internal	✓	
	_approve	Internal	✓	
	_spendAllowance	Internal	✓	
	_beforeTokenTransfer	Internal	✓	
	_afterTokenTransfer	Internal	✓	
ERC20Permit	Implementation	ERC20, IERC20Permit, EIP712		
		Public	✓	EIP712
	permit	Public	✓	-
	nonces	Public		-
	DOMAIN_SEPARATOR	External		-
	_useNonce	Internal	✓	
IERC20Permit	Interface			
	permit	External	✓	-
	nonces	External		-
	DOMAIN_SEPARATOR	External		-
ERC20Votes	Implementation	IVotes, ERC20Permit		

	checkpoints	Public		-
	numCheckpoints	Public		-
	delegates	Public		-
	getVotes	Public		-
	getPastVotes	Public		-
	getPastTotalSupply	Public		-
	_checkpointsLookup	Private		
	delegate	Public	✓	-
	delegateBySig	Public	✓	-
	_maxSupply	Internal		
	_mint	Internal	✓	
	_burn	Internal	✓	
	_afterTokenTransfer	Internal	✓	
	_delegate	Internal	✓	
	_moveVotingPower	Private	✓	
	_writeCheckpoint	Private	✓	
	_add	Private		
	_subtract	Private		
	_unsafeAccess	Private		
IERC20Metadata	Interface	IERC20		
	name	External		-
	symbol	External		-
	decimals	External		-
IERC20	Interface			
	totalSupply	External		-
	balanceOf	External		-
	transfer	External	✓	-

	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
Context	Implementation			
	_msgSender	Internal		
	_msgData	Internal		
Counters	Library			
	current	Internal		
	increment	Internal	✓	
	decrement	Internal	✓	
	reset	Internal	✓	
ECDSA	Library			
	_throwError	Private		
	tryRecover	Internal		
	recover	Internal		
	tryRecover	Internal		
	recover	Internal		
	tryRecover	Internal		
	recover	Internal		
	toEthSignedMessageHash	Internal		
	toEthSignedMessageHash	Internal		
	toTypedDataHash	Internal		
EIP712	Implementation			
		Public	✓	-
	_domainSeparatorV4	Internal		

	_buildDomainSeparator	Private		
	_hashTypedDataV4	Internal		
Math	Library			
	max	Internal		
	min	Internal		
	average	Internal		
	ceilDiv	Internal		
	mulDiv	Internal		
	mulDiv	Internal		
	sqrt	Internal		
	sqrt	Internal		
	log2	Internal		
	log2	Internal		
	log10	Internal		
	log10	Internal		
	log256	Internal		
	log256	Internal		
SafeCast	Library			
	toUint248	Internal		
	toUint240	Internal		
	toUint232	Internal		
	toUint224	Internal		
	toUint216	Internal		
	toUint208	Internal		
	toUint200	Internal		
	toUint192	Internal		
	toUint184	Internal		

	toUint176	Internal		
	toUint168	Internal		
	toUint160	Internal		
	toUint152	Internal		
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	toUint136	Internal		
	toUint128	Internal		
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	toUint24	Internal		
	toUint16	Internal		
	toUint8	Internal		
	toUint256	Internal		
	toInt248	Internal		
	toInt240	Internal		
	toInt232	Internal		
	toInt224	Internal		
	toInt216	Internal		
	toInt208	Internal		

	toInt200	Internal		
	toInt192	Internal		
	toInt184	Internal		
	toInt176	Internal		
	toInt168	Internal		
	toInt160	Internal		
	toInt152	Internal		
	toInt144	Internal		
	toInt136	Internal		
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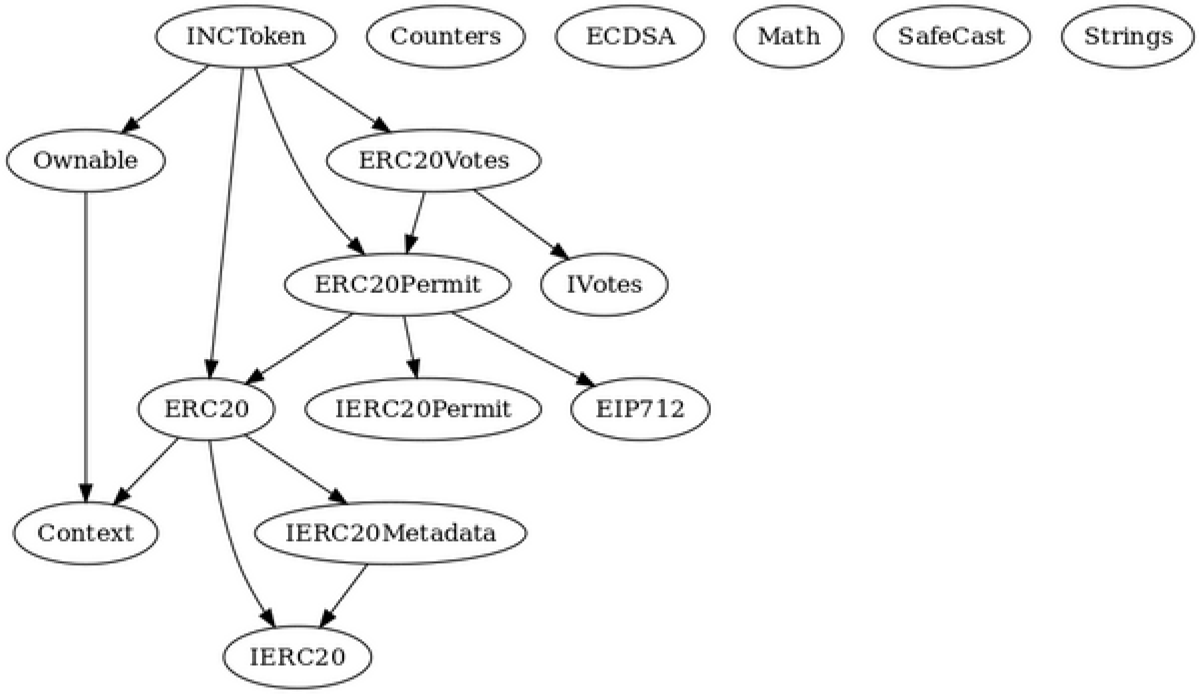
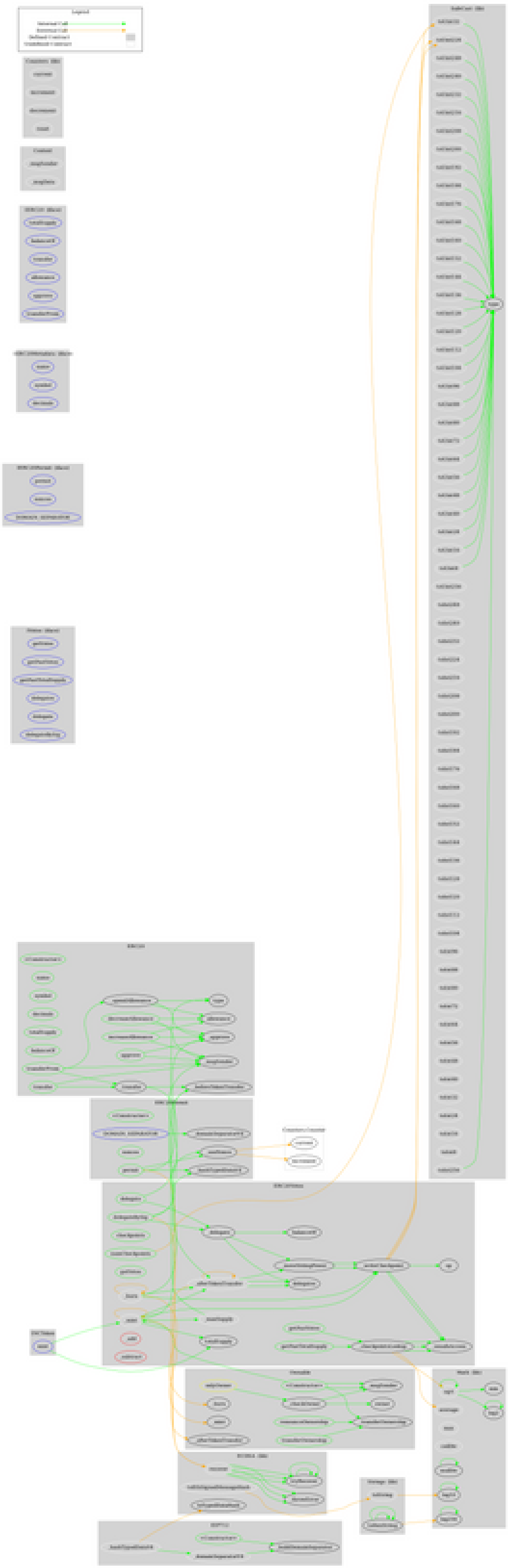
	toInt96	Internal		
	toInt88	Internal		
	toInt80	Internal		
	toInt72	Internal		
	toInt64	Internal		
	toInt56	Internal		
	toInt48	Internal		
	toInt40	Internal		
	toInt32	Internal		
	toInt24	Internal		
	toInt16	Internal		
	toInt8	Internal		
	toInt256	Internal		
Strings	Library			
	toString	Internal		

	toHexString	Internal		
	toHexString	Internal		
	toHexString	Internal		
INCToken	Implementation	ERC20, ERC20Permit, ERC20Votes, Ownable		
		Public	✓	ERC20 ERC20Permit
	mint	External	✓	onlyOwner
	_afterTokenTransfer	Internal	✓	
	_mint	Internal	✓	
	_burn	Internal	✓	

Inheritance Graph



Flow Graph



Summary

The smart contract is managed by a governor contract. Hence, the mint functionality can only be called by the governor contract. This audit investigates security issues, business logic concerns and potential improvements.

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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