Cyberscope

Audit Report

MyVolt Token

March 2024

Repository https://github.com/MyVoltEnergy/MyVolt-Solidity-

Commit 752c8a6206192fd76faaa5d52705070e723f426a

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Table of Contents

Review

Contract Name	MyVoltToken
Repository	https://github.com/MyVoltEnergy/MyVolt-Solidity-
Commit	752c8a6206192fd76faaa5d52705070e723f426a
Testing Deploy	https://testnet.bscscan.com/address/0x0f27a3b6c2bf65c44f3e00b4baaaba12b34cda68
Symbol	MVOLT
Decimals	18
Total Supply	745,000,000

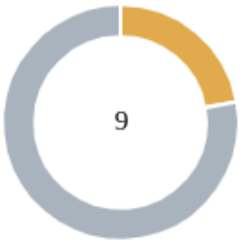
Audit Updates

Initial Audit	15 Mar 2024

Source Files

Filename	SHA256
contracts/MyVoltToken.sol	6a636eeb1854d96d80dc75f51724d0c0bfb92a20911de3cb655f21fea29132c4

Findings Breakdown



Critical	0
Medium	2
Minor / Informative	7

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	0	0	0	0
Medium	2	0	0	0
Minor / Informative	7	0	0	0

Diagnostics

Critical Medium Minor / Informative

Severity	Code	Description	Status
Medium	BC	Blacklists Addresses	Unresolved
Medium	MT	Mints Tokens	Unresolved
Minor / Informative	IMP	Inefficient Minting Process	Unresolved
Minor / Informative	MEE	Missing Events Emission	Unresolved
Minor / Informative	RSW	Redundant Storage Writes	Unresolved
Minor / Informative	ST	Stops Transactions	Unresolved
Minor / Informative	TUU	Time Units Usage	Unresolved
Minor / Informative	UFR	Unutilized Function Redundancy	Unresolved
Minor / Informative	L04	Conformance to Solidity Naming Conventions	Unresolved

BC - Blacklists Addresses

Criticality	Medium
Location	contracts/MyVoltToken.sol#L347
Status	Unresolved

Description

The contract owner has the authority to stop addresses from transactions. The owner may take advantage of it by calling the `executeSetBlacklist` function.

```
    function executeSetBlacklist(
        address account,
        bool value
    )
        external
        onlyOwner
        executable(keccak256(abi.encodePacked("setBlacklist", account, value)))
    {
        _isBlacklisted[account] = value;
    }
```

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.

Temporary Solutions:

These measurements do not decrease the severity of the finding

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-signature wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.

Permanent Solution:

- Renouncing the ownership, which will eliminate the threats but it is non-reversible.

MT - Mints Tokens

Criticality	Medium
Location	contracts/MyVoltToken.sol#L470
Status	Unresolved

Description

The contract owner has the authority to mint tokens. The owner may take advantage of it by calling the `mintTokensForEcosystem` function. As a result, the contract tokens will be highly inflated.

```
    function _mintForEcosystem() private onlyOwner {
        require(stakingContract != address(0), "Staking address
not set");
        uint256 ecosystemAmount = 255000000 * 10 ** 18;
        _mint(stakingContract, ecosystemAmount);
        emit TokensMintedForEcosystem(stakingContract,
ecosystemAmount);
    }

    function mintTokensForEcosystem() external onlyOwner {
        _mintForEcosystem();
    }
```

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.

Temporary Solutions:

These measurements do not decrease the severity of the finding

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-signature wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.

Permanent Solution:

- Renouncing the ownership, which will eliminate the threats but it is non-reversible.

IMP - Inefficient Minting Process

Criticality	Minor / Informative
Location	contracts/MyVoltToken.sol#L445
Status	Unresolved

Description

The contract is designed to mint tokens to the same `vestingContractAddress` multiple times across different categories such as Seed Sale, Public Sale, Team, Treasury, Marketing, Advisors, and Liquidity Pool. This approach involves calling the `_mint` function separately for each category, despite all tokens being allocated to the same address. This method of individually minting tokens for different purposes, while using the same destination address, introduces unnecessary complexity and increases the transaction cost due to the repeated execution of the minting function. Moreover, this minting strategy does not leverage the potential for simplification and efficiency that could be achieved by consolidating these operations into a single minting action, especially since the cumulative total supply to be minted to the vestingContractAddress is predetermined.

```
    function _distributeTokens(address vestingContractAddress)
private {
        //uint256 theToken = 1e18;

        // Seed Sale
        _mint(vestingContractAddress, 30000000 * 10 ** 18);

        // Public Sale
        _mint(vestingContractAddress, 90000000 * 10 ** 18);

        // Team
        _mint(vestingContractAddress, 100000000 * 10 ** 18);

        // Treasury
        _mint(vestingContractAddress, 280000000 * 10 ** 18);

        // Marketing
        _mint(vestingContractAddress, 85000000 * 10 ** 18);

        // Advisors
        _mint(vestingContractAddress, 55000000 * 10 ** 18);

        // Liquidity Pool
        _mint(vestingContractAddress, 105000000 * 10 ** 18);
    }
```

Recommendation

It is recommended to consolidate the multiple minting operations into a single minting action by calculating the total amount of tokens to be allocated to the vestingContractAddress across all categories beforehand. This can be achieved by summing up the individual amounts for Seed Sale, Public Sale, Team, Treasury, Marketing, Advisors, and Liquidity Pool, and then performing a single _mint operation with this total amount. This streamlined approach reduces the number of transactions required, thereby minimizing gas costs and simplifying the contract's logic. Additionally, consolidating the minting process enhances the contract's clarity and maintainability, making it easier for developers and auditors to understand the token distribution mechanism. This recommendation aims to optimize the contract's efficiency and cost-effectiveness while maintaining its intended functionality.

MEE - Missing Events Emission

Criticality	Minor / Informative
Location	contracts/MyVoltToken.sol#L405
Status	Unresolved

Description

The contract performs actions and state mutations from external methods that do not result in the emission of events. Emitting events for significant actions is important as it allows external parties, such as wallets or dApps, to track and monitor the activity on the contract. Without these events, it may be difficult for external parties to accurately determine the current state of the contract.

```
    function executeSetBlacklist(
        address account,
        bool value
    )
        external
        onlyOwner
        executable(keccak256(abi.encodePacked("setBlacklist",
account, value)))
    {
        _isBlacklisted[account] = value;
    }
```

Recommendation

It is recommended to include events in the code that are triggered each time a significant action is taking place within the contract. These events should include relevant details such as the user's address and the nature of the action taken. By doing so, the contract will be more transparent and easily auditable by external parties. It will also help prevent potential issues or disputes that may arise in the future.

RSW - Redundant Storage Writes

Criticality	Minor / Informative
Location	contracts/MyVoltToken.sol#L405
Status	Unresolved

Description

The contract modifies the state of the following variables without checking if their current value is the same as the one given as an argument. As a result, the contract performs redundant storage writes, when the provided parameter matches the current state of the variables, leading to unnecessary gas consumption and inefficiencies in contract execution.

```
    function executeSetBlacklist(
        address account,
        bool value
    )
        external
        onlyOwner
        executable(keccak256(abi.encodePacked("setBlacklist",
account, value)))
    {
        _isBlacklisted[account] = value;
    }
```

Recommendation

The team is advised to implement additional checks within to prevent redundant storage writes when the provided argument matches the current state of the variables. By incorporating statements to compare the new values with the existing values before proceeding with any state modification, the contract can avoid unnecessary storage operations, thereby optimizing gas usage.

ST - Stops Transactions

Criticality	Minor / Informative
Location	contracts/MyVoltToken.sol#L378
Status	Unresolved

Description

The contract owner has the authority to stop the transaction for all users. The owner may take advantage of it by calling the `executePause` function.

```
    function executePause() external onlyOwner
executable(keccak256("pause")) {
        _pause();
    }
```

Recommendation

The contract could embody a check for not allowing setting the `_maxTxAmount` less than a reasonable amount. A suggested implementation could check that the minimum amount should be more than a fixed percentage of the total supply. 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.

Temporary Solutions:

These measurements do not decrease the severity of the finding

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-signature wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.

Permanent Solution:

- Renouncing the ownership, which will eliminate the threats but it is non-reversible.

TUU - Time Units Usage

Criticality	Minor / Informative
Location	contracts/MyVoltToken.sol#L326
Status	Unresolved

Description

The contract is using arbitrary numbers to form time-related values. As a result, it decreases the readability of the codebase and prevents the compiler to optimize the source code.

```
uint256 public constant MIN_DELAY = 60;
```

Recommendation

It is a good practice to use the time units reserved keywords like `seconds` , `minutes` , `hours` , `days` and `weeks` to process time-related calculations.

It's important to note that these time units are simply a shorthand notation for representing time in seconds, and do not have any effect on the actual passage of time or the execution of the contract. The time units are simply a convenience for expressing time in a more human-readable form.

UFR - Unutilized Function Redundancy

Criticality	Minor / Informative
Location	contracts/MyVoltToken.sol#L429
Status	Unresolved

Description

The contract is designed to set the `vestingContract` address during its constructor phase, establishing the initial vesting contract to which tokens are allocated or managed. However, it also includes the `setVestingContract` function, that allows for updating the `vestingContract` address post-deployment. This function is intended to provide flexibility in managing the vesting contract address. Despite this intention, the audit reveals that the contract does not utilize the vestingContract address beyond the constructor phase for any operational purposes, such as token distribution or vesting management. Consequently, the ability to update the `vestingContract` address through the `setVestingContract` function becomes redundant, as changing the address after the initial setup does not impact the contract's functionality or behavior. This redundancy not only adds unnecessary complexity to the contract but also poses a risk of confusion, suggesting a level of flexibility and functionality that is not actually supported by the contract's logic.

```
   function setVestingContract(address newContract) external
onlyOwner {
        require(newContract != address(0), "Invalid Address!");
        vestingContract = newContract;
    }
```

Recommendation

It is recommended to remove the redundant `setVestingContract` function from the contract. Eliminating this function simplifies the contract, reducing its complexity and potential attack surface. By removing the ability to change the vestingContract address post-deployment, the contract's code more accurately reflects its operational capabilities and limitations, enhancing clarity and maintainability. Additionally, this change ensures that the contract's behavior remains consistent with its design intentions, avoiding any

confusion or misleading implications about the role and utility of the vestingContract address within the contract's ecosystem. This recommendation aligns with best practices for smart contract development, emphasizing simplicity, security, and clarity.

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	contracts/MyVoltToken.sol#L323,434
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 => bool) public _isBlacklisted
address _stakingContract
```

Recommendation

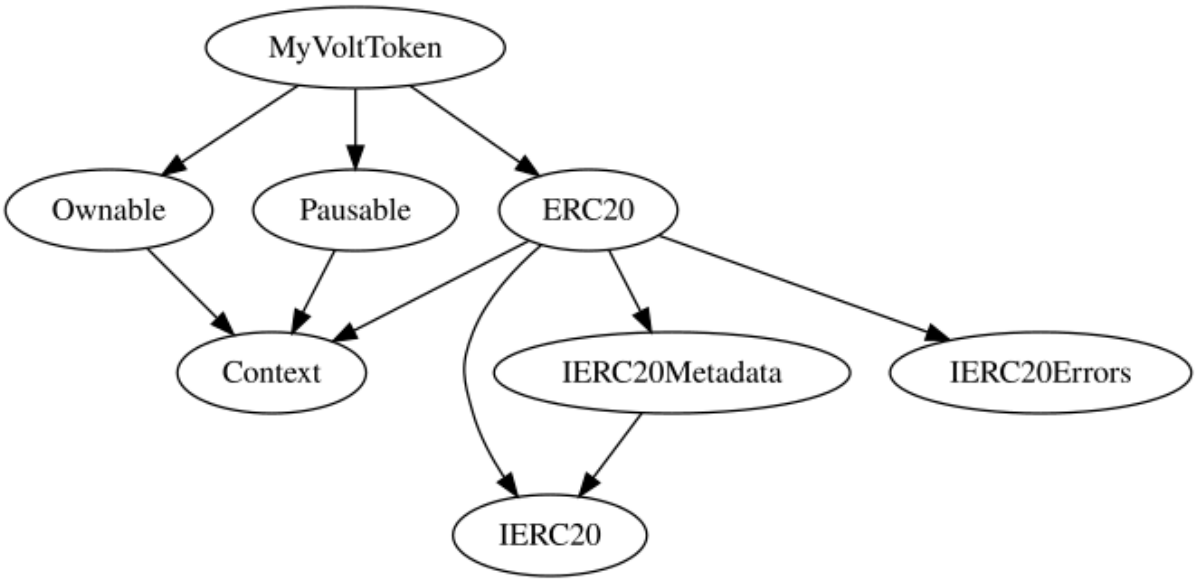
By following the Solidity naming convention guidelines, the codebase increased the readability, maintainability, and makes it easier to work with.
Find more information on the Solidity documentation
https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-convention.

Functions Analysis

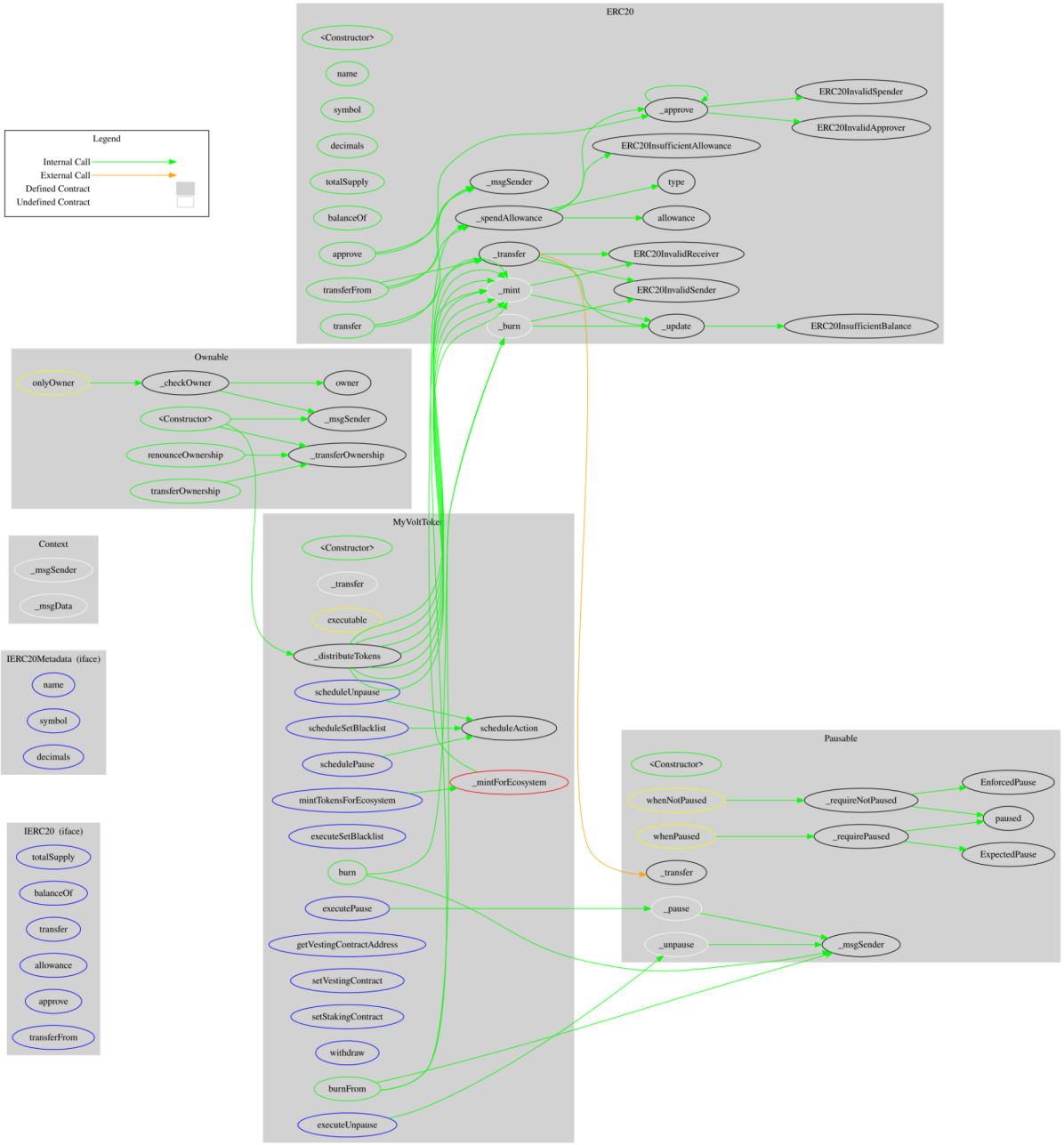
Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
MyVoltToken	Implementation	ERC20, Ownable, Pausable		
		Public	✓	ERC20
	_transfer	Internal	✓	whenNotPaused
	scheduleAction	Internal	✓	onlyOwner
	schedulePause	External	✓	onlyOwner
	executePause	External	✓	onlyOwner executable
	scheduleUnpause	External	✓	onlyOwner
	executeUnpause	External	✓	onlyOwner executable
	scheduleSetBlacklist	External	✓	onlyOwner
	executeSetBlacklist	External	✓	onlyOwner executable
	burn	Public	✓	-
	burnFrom	Public	✓	-
	getVestingContractAddress	External		-
	setVestingContract	External	✓	onlyOwner
	setStakingContract	External	✓	onlyOwner
	withdraw	External	✓	onlyOwner
	_distributeTokens	Private	✓	

	_mintForEcosystem	Private	✓	onlyOwner
	mintTokensForEcosystem	External	✓	onlyOwner

Inheritance Graph



Flow Graph


ERC20
<Constructor>
name
symbol
decimals
totalSupply
balanceOf
approve
transferFrom
transfer
_msgSender
_spendAllowance
_transfer
_mint
_burn
_approve
type
allowance
ERC20InvalidSpender
ERC20InvalidApprover
ERC20InsufficientAllowance
ERC20InvalidReceiver
ERC20InvalidSender
_update
ERC20InsufficientBalance
Legend
Internal Call
External Call
Defined Contract
Undefined Contract
Ownable
onlyOwner
_checkOwner
owner
<Constructor>
_msgSender
renounceOwnership
_transferOwnership
transferOwnership
Context
_msgSender
_msgData
IERC20Metadata (iface)
name
symbol
decimals
IERC20 (iface)
totalSupply
balanceOf
transfer
allowance
approve
transferFrom
MyVoltToken
<Constructor>
_transfer
executable
_distributeTokens
scheduleUnpause
scheduleSetBlacklist
schedulePause
mintTokensForEcosystem
executeSetBlacklist
burn
executePause
getVestingContractAddress
setVestingContract
setStakingContract
withdraw
burnFrom
executeUnpause
scheduleAction
_mintForEcosystem
Pausable
<Constructor>
whenNotPaused
whenPaused
_transfer
_pause
_unpause
_requireNotPaused
_requirePaused
_msgSender
EnforcedPause
paused
ExpectedPause

Summary

MyVolt contract implements a token mechanism. This audit investigates security issues, business logic concerns and potential improvements.

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The Cyberscope team

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