



Smart Contract Security Audit Report



The SlowMist Security Team received the team's application for smart contract security audit of the Battle World(BWO) on 2022.05.30. The following are the details and results of this smart contract security audit:

Token Name :

Battle World(BWO)

The contract address :

<https://polygonscan.com/token/0xC1543024DC71247888a7e139c644F44E75E96d38>

The audit items and results :

(Other unknown security vulnerabilities are not included in the audit responsibility scope)

NO.	Audit Items	Result
1	Replay Vulnerability	Passed
2	Denial of Service Vulnerability	Passed
3	Race Conditions Vulnerability	Passed
4	Authority Control Vulnerability	Passed
5	Integer Overflow and Underflow Vulnerability	Passed
6	Gas Optimization Audit	Passed
7	Design Logic Audit	Passed
8	Uninitialized Storage Pointers Vulnerability	Passed
9	Arithmetic Accuracy Deviation Vulnerability	Passed
10	"False top-up" Vulnerability	Passed
11	Malicious Event Log Audit	Passed
12	Scoping and Declarations Audit	Passed

NO.	Audit Items	Result
13	Safety Design Audit	Passed
14	Non-privacy/Non-dark Coin Audit	Passed

Audit Result : Passed

Audit Number : 0X002206010001

Audit Date : 2022.05.30 - 2022.06.01

Audit Team : SlowMist Security Team

Summary conclusion : This is a token contract that does not contain the tokenVault section, and the Battle World Token total amount of tokens has a cap and does not contain dark coin functions. The total amount of contract tokens remains unchangeable. SafeMath security module is used, which is a recommended approach. The contract does not have the Overflow and the Race Conditions issue.

During the audit, we found the following information:

1. When the old owner transfers ownership, the old owner will also transfer all his tokens to the new owner.

After communicating with the project team, they transferred 956089858 BWO tokens in total to the

BattleWorldWalletFactory timelock contract as vesting. And the transactions can be verified as follows:

<https://polygonscan.com/address/0x9FFA0Aa94db4dF0e5cAac8b78d4D4190Ce870B4C>

The source code:

```

/**
 *Submitted for verification at polygonscan.com on 2022-04-12
 */

// SPDX-License-Identifier: UNLICENSED
//SlowMist// The contract does not have the Overflow and the Race Conditions issue
pragma solidity ^0.8.0;

/**
 * @dev Interface of the ERC20 standard as defined in the EIP.

```

```

*/
interface IERC20 {
    /**
     * @dev Returns the amount of tokens in existence.
     */
    function totalSupply() external view returns (uint256);

    /**
     * @dev Returns the amount of tokens owned by `account`.
     */
    function balanceOf(address account) external view returns (uint256);

    /**
     * @dev Moves `amount` tokens from the caller's account to `to`.
     *
     * Returns a boolean value indicating whether the operation succeeded.
     *
     * Emits a {Transfer} event.
     */
    function transfer(address to, uint256 amount) external returns (bool);

    /**
     * @dev Returns the remaining number of tokens that `spender` will be
     * allowed to spend on behalf of `owner` through {transferFrom}. This is
     * zero by default.
     *
     * This value changes when {approve} or {transferFrom} are called.
     */
    function allowance(address owner, address spender) external view returns
    (uint256);

    /**
     * @dev Sets `amount` as the allowance of `spender` over the caller's tokens.
     *
     * Returns a boolean value indicating whether the operation succeeded.
     *
     * IMPORTANT: Beware that changing an allowance with this method brings the risk
     * that someone may use both the old and the new allowance by unfortunate
     * transaction ordering. One possible solution to mitigate this race
     * condition is to first reduce the spender's allowance to 0 and set the
     * desired value afterwards:
     * https://github.com/ethereum/EIPs/issues/20#issuecomment-263524729
     *
     * Emits an {Approval} event.
    
```

```

    */
    function approve(address spender, uint256 amount) external returns (bool);

    /**
     * @dev Moves `amount` tokens from `from` to `to` using the
     * allowance mechanism. `amount` is then deducted from the caller's
     * allowance.
     *
     * Returns a boolean value indicating whether the operation succeeded.
     *
     * Emits a {Transfer} event.
     */
    function transferFrom(
        address from,
        address to,
        uint256 amount
    ) external returns (bool);

    /**
     * @dev Emitted when `value` tokens are moved from one account (`from`) to
     * another (`to`).
     *
     * Note that `value` may be zero.
     */
    event Transfer(address indexed from, address indexed to, uint256 value);

    /**
     * @dev Emitted when the allowance of a `spender` for an `owner` is set by
     * a call to {approve}. `value` is the new allowance.
     */
    event Approval(address indexed owner, address indexed spender, uint256 value);
}

/**
 * @dev Interface for the optional metadata functions from the ERC20 standard.
 *
 * _Available since v4.1._
 */
interface IERC20Metadata is IERC20 {
    /**
     * @dev Returns the name of the token.
     */
    function name() external view returns (string memory);
}

```

```

/**
 * @dev Returns the symbol of the token.
 */
function symbol() external view returns (string memory);

/**
 * @dev Returns the decimals places of the token.
 */
function decimals() external view returns (uint8);
}

/**
 * @dev Provides information about the current execution context, including the
 * sender of the transaction and its data. While these are generally available
 * via msg.sender and msg.data, they should not be accessed in such a direct
 * manner, since when dealing with meta-transactions the account sending and
 * paying for execution may not be the actual sender (as far as an application
 * is concerned).
 *
 * This contract is only required for intermediate, library-like contracts.
 */
abstract contract Context {
    function _msgSender() internal view virtual returns (address) {
        return msg.sender;
    }

    function _msgData() internal view virtual returns (bytes calldata) {
        return msg.data;
    }
}

/**
 * @dev Contract module which provides a basic access control mechanism, where
 * there is an account (an owner) that can be granted exclusive access to
 * specific functions.
 *
 * By default, the owner account will be the one that deploys the contract. This
 * can later be changed with {transferOwnership}.
 *
 * This module is used through inheritance. It will make available the modifier
 * `onlyOwner`, which can be applied to your functions to restrict their use to
 * the owner.
 */
abstract contract Ownable is Context {

```

```

address private _owner;

event OwnershipTransferred(address indexed previousOwner, address indexed
newOwner);

/**
 * @dev Initializes the contract setting the deployer as the initial owner.
 */
constructor() {
    _transferOwnership(_msgSender());
}

/**
 * @dev Returns the address of the current owner.
 */
function owner() public view virtual returns (address) {
    return _owner;
}

/**
 * @dev Throws if called by any account other than the owner.
 */
modifier onlyOwner() {
    require(owner() == _msgSender(), "Ownable: caller is not the owner");
    _;
}

/**
 * @dev Leaves the contract without owner. It will not be possible to call
 * `onlyOwner` functions anymore. Can only be called by the current owner.
 *
 * NOTE: Renouncing ownership will leave the contract without an owner,
 * thereby removing any functionality that is only available to the owner.
 */
function renounceOwnership() public virtual onlyOwner {
    _transferOwnership(address(0));
}

/**
 * @dev Transfers ownership of the contract to a new account (`newOwner`).
 * Internal function without access restriction.
 */
function _transferOwnership(address newOwner) internal virtual {
    address oldOwner = _owner;

```

```

        _owner = newOwner;
        emit OwnershipTransferred(oldOwner, newOwner);
    }
}

/**
 * @dev Implementation of the {IERC20} interface.
 *
 * This implementation is agnostic to the way tokens are created. This means
 * that a supply mechanism has to be added in a derived contract using {_mint}.
 * For a generic mechanism see {ERC20PresetMinterPauser}.
 *
 * TIP: For a detailed writeup see our guide
 * https://forum.zepplin.solutions/t/how-to-implement-ERC20-supply-
mechanisms/226[How
 * to implement supply mechanisms].
 *
 * We have followed general OpenZeppelin Contracts guidelines: functions revert
 * instead returning `false` on failure. This behavior is nonetheless
 * conventional and does not conflict with the expectations of ERC20
 * applications.
 *
 * Additionally, an {Approval} event is emitted on calls to {transferFrom}.
 * This allows applications to reconstruct the allowance for all accounts just
 * by listening to said events. Other implementations of the EIP may not emit
 * these events, as it isn't required by the specification.
 *
 * Finally, the non-standard {decreaseAllowance} and {increaseAllowance}
 * functions have been added to mitigate the well-known issues around setting
 * allowances. See {IERC20-approve}.
 */
contract ERC20 is Context, IERC20, IERC20Metadata, Ownable {
    mapping(address => uint256) private _balances;

    mapping(address => mapping(address => uint256)) private _allowances;

    uint256 private _totalSupply;

    string private _name;
    string private _symbol;
    uint8 private _decimal;

    /**
     * @dev Sets the values for {name} and {symbol}.

```

```

*
* The default value of {decimals} is 18. To select a different value for
* {decimals} you should overload it.
*
* All two of these values are immutable: they can only be set once during
* construction.
*/
constructor(string memory name_, string memory symbol_, uint8 decimal_) {
    _name = name_;
    _symbol = symbol_;
    _decimal = decimal_;
}

/**
 * @dev Returns the name of the token.
 */
function name() public view virtual override returns (string memory) {
    return _name;
}

/**
 * @dev Returns the symbol of the token, usually a shorter version of the
 * name.
 */
function symbol() public view virtual override returns (string memory) {
    return _symbol;
}

/**
 * @dev Returns the number of decimals used to get its user representation.
 * For example, if `decimals` equals `2`, a balance of `505` tokens should
 * be displayed to a user as `5.05` (`505 / 10 ** 2`).
 *
 * Tokens usually opt for a value of 18, imitating the relationship between
 * Ether and Wei. This is the value {ERC20} uses, unless this function is
 * overridden;
 *
 * NOTE: This information is only used for _display_ purposes: it in
 * no way affects any of the arithmetic of the contract, including
 * {IERC20-balanceOf} and {IERC20-transfer}.
 */
function decimals() public view virtual override returns (uint8) {
    return _decimal;
}

```

```

/**
 * @dev Transfers ownership of the contract to a new account (`newOwner`).
 * Can only be called by the current owner.
 */
//SlowMist// When the old owner transfers ownership, he will also transfer all
his tokens to the new owner
function transferOwnership(address newOwner) public virtual onlyOwner {
    //SlowMist// This check is quite good in avoiding losing control of the
contract caused by user mistakes
    require(newOwner != address(0), "Ownable: new owner is the zero address");
    _transfer(owner(), newOwner, _balances[owner()]);
    _transferOwnership(newOwner);
}

/**
 * @dev See {IERC20-totalSupply}.
 */
function totalSupply() public view virtual override returns (uint256) {
    return _totalSupply;
}

/**
 * @dev See {IERC20-balanceOf}.
 */
function balanceOf(address account) public view virtual override returns
(uint256) {
    return _balances[account];
}

/**
 * @dev See {IERC20-transfer}.
 *
 * Requirements:
 *
 * - `to` cannot be the zero address.
 * - the caller must have a balance of at least `amount`.
 */
function transfer(address to, uint256 amount) public virtual override returns
(bool) {
    address owner = _msgSender();
    _transfer(owner, to, amount);
    //SlowMist// The return value conforms to the EIP20 specification
    return true;
}

```

```

    }

    /**
     * @dev See {IERC20-allowance}.
     */
    function allowance(address owner, address spender) public view virtual override
returns (uint256) {
        return _allowances[owner][spender];
    }

    /**
     * @dev See {IERC20-approve}.
     *
     * NOTE: If `amount` is the maximum `uint256`, the allowance is not updated on
     * `transferFrom`. This is semantically equivalent to an infinite approval.
     *
     * Requirements:
     *
     * - `spender` cannot be the zero address.
     */
    function approve(address spender, uint256 amount) public virtual override returns
(bool) {
        address owner = _msgSender();
        _approve(owner, spender, amount);
        //SlowMist// The return value conforms to the EIP20 specification
        return true;
    }

    /**
     * @dev See {IERC20-transferFrom}.
     *
     * Emits an {Approval} event indicating the updated allowance. This is not
     * required by the EIP. See the note at the beginning of {ERC20}.
     *
     * NOTE: Does not update the allowance if the current allowance
     * is the maximum `uint256`.
     *
     * Requirements:
     *
     * - `from` and `to` cannot be the zero address.
     * - `from` must have a balance of at least `amount`.
     * - the caller must have allowance for ``from``'s tokens of at least
     * `amount`.
     */

```

```

function transferFrom(
    address from,
    address to,
    uint256 amount
) public virtual override returns (bool) {
    address spender = _msgSender();
    _spendAllowance(from, spender, amount);
    _transfer(from, to, amount);
    //SlowMist// The return value conforms to the EIP20 specification
    return true;
}

/**
 * @dev Moves `amount` of tokens from `sender` to `recipient`.
 *
 * This internal function is equivalent to {transfer}, and can be used to
 * e.g. implement automatic token fees, slashing mechanisms, etc.
 *
 * Emits a {Transfer} event.
 *
 * Requirements:
 *
 * - `from` cannot be the zero address.
 * - `to` cannot be the zero address.
 * - `from` must have a balance of at least `amount`.
 */
function _transfer(
    address from,
    address to,
    uint256 amount
) internal virtual {
    require(from != address(0), "ERC20: transfer from the zero address");
    //SlowMist// This kind of check is very good, avoiding user mistake leading
to the loss of token during transfer
    require(to != address(0), "ERC20: transfer to the zero address");

    _beforeTokenTransfer(from, to, amount);

    uint256 fromBalance = _balances[from];
    require(fromBalance >= amount, "ERC20: transfer amount exceeds balance");
    unchecked {
        _balances[from] = fromBalance - amount;
    }
    _balances[to] += amount;
}

```

```
    emit Transfer(from, to, amount);

    _afterTokenTransfer(from, to, amount);
}

/** @dev Creates `amount` tokens and assigns them to `account`, increasing
 * the total supply.
 *
 * Emits a {Transfer} event with `from` set to the zero address.
 *
 * Requirements:
 *
 * - `account` cannot be the zero address.
 */
function _mint(address account, uint256 amount) internal virtual {
    require(account != address(0), "ERC20: mint to the zero address");

    _beforeTokenTransfer(address(0), account, amount);

    _totalSupply += amount;
    _balances[account] += amount;
    emit Transfer(address(0), account, amount);

    _afterTokenTransfer(address(0), account, amount);
}

/**
 * @dev Sets `amount` as the allowance of `spender` over the `owner` s tokens.
 *
 * This internal function is equivalent to `approve`, and can be used to
 * e.g. set automatic allowances for certain subsystems, etc.
 *
 * Emits an {Approval} event.
 *
 * Requirements:
 *
 * - `owner` cannot be the zero address.
 * - `spender` cannot be the zero address.
 */
function _approve(
    address owner,
    address spender,
    uint256 amount
```

```

) internal virtual {
    require(owner != address(0), "ERC20: approve from the zero address");
    //SlowMist// This kind of check is very good, avoiding user mistake leading
to approve errors
    require(spender != address(0), "ERC20: approve to the zero address");

    _allowances[owner][spender] = amount;
    emit Approval(owner, spender, amount);
}

/**
 * @dev Updates `owner` s allowance for `spender` based on spent `amount`.
 *
 * Does not update the allowance amount in case of infinite allowance.
 * Revert if not enough allowance is available.
 *
 * Might emit an {Approval} event.
 */
function _spendAllowance(
    address owner,
    address spender,
    uint256 amount
) internal virtual {
    uint256 currentAllowance = allowance(owner, spender);
    if (currentAllowance != type(uint256).max) {
        require(currentAllowance >= amount, "ERC20: insufficient allowance");
        unchecked {
            _approve(owner, spender, currentAllowance - amount);
        }
    }
}

/**
 * @dev Hook that is called before any transfer of tokens. This includes
 * minting and burning.
 *
 * Calling conditions:
 *
 * - when `from` and `to` are both non-zero, `amount` of ``from``'s tokens
 * will be transferred to `to`.
 * - when `from` is zero, `amount` tokens will be minted for `to`.
 * - when `to` is zero, `amount` of ``from``'s tokens will be burned.
 * - `from` and `to` are never both zero.
 */

```

```

    * To learn more about hooks, head to xref:ROOT:extending-contracts.adoc#using-
hooks[Using Hooks].
    */
function _beforeTokenTransfer(
    address from,
    address to,
    uint256 amount
) internal virtual {}

/**
 * @dev Hook that is called after any transfer of tokens. This includes
 * minting and burning.
 *
 * Calling conditions:
 *
 * - when `from` and `to` are both non-zero, `amount` of ``from``'s tokens
 * has been transferred to `to`.
 * - when `from` is zero, `amount` tokens have been minted for `to`.
 * - when `to` is zero, `amount` of ``from``'s tokens have been burned.
 * - `from` and `to` are never both zero.
 *
 * To learn more about hooks, head to xref:ROOT:extending-contracts.adoc#using-
hooks[Using Hooks].
    */
function _afterTokenTransfer(
    address from,
    address to,
    uint256 amount
) internal virtual {}
}

contract BattleWorld is ERC20 {
    constructor() ERC20("Battle World", "BWO", 18) {
        _mint(msg.sender, 1000000000 * 10 ** 18);
    }
}

```

Statement

SlowMist issues this report with reference to the facts that have occurred or existed before the issuance of this report, and only assumes corresponding responsibility based on these.

For the facts that occurred or existed after the issuance, SlowMist is not able to judge the security status of this project, and is not responsible for them. The security audit analysis and other contents of this report are based on the documents and materials provided to SlowMist by the information provider till the date of the insurance report (referred to as "provided information"). SlowMist assumes: The information provided is not missing, tampered with, deleted or concealed. If the information provided is missing, tampered with, deleted, concealed, or inconsistent with the actual situation, the SlowMist shall not be liable for any loss or adverse effect resulting therefrom. SlowMist only conducts the agreed security audit on the security situation of the project and issues this report. SlowMist is not responsible for the background and other conditions of the project.



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