



Smart Contract Security Audit Report



The SlowMist Security Team received the team's application for smart contract security audit of the Uniswap (UNI) on 2024.05.12. The following are the details and results of this smart contract security audit:

Token Name :

Uniswap (UNI)

The contract address :

<https://etherscan.io/token/0x1f9840a85d5af5bf1d1762f925bdaddc4201f984>

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 Audit	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
13	Safety Design Audit	Passed
14	Non-privacy/Non-dark Coin Audit	Passed

Audit Result : Passed

Audit Number : 0X002405120001

Audit Date : 2024.05.12 - 2024.05.12

Audit Team : SlowMist Security Team

Summary conclusion : This is a token contract that contains the delegate section and dark coin functions. The total amount of contract tokens can be changed. The contract does not have the Overflow and the Race Conditions issue.

During the audit, we found the following information:

1. The minter role can transfer the minter role address.
2. The minter role can mint tokens again 365 days after each call to the mint function, with a maximum amount of 2% of totalSupply each time.

The minter role is a uniswap Timelock contract, and the contract address is as follows:

0x1a9C8182C09F50C8318d769245beA52c32BE35BC

The source code:

```
/**
 *Submitted for verification at Etherscan.io on 2020-09-16
 */

/**
 *Submitted for verification at Etherscan.io on 2020-09-15
 */
//SlowMist// The contract does not have the Overflow and the Race Conditions issue
pragma solidity ^0.5.16;
pragma experimental ABIEncoderV2;

// From https://github.com/OpenZeppelin/openzeppelin-
contracts/blob/master/contracts/math/Math.sol
// Subject to the MIT license.

/**
 * @dev Wrappers over Solidity's arithmetic operations with added overflow
 * checks.
 *
 * Arithmetic operations in Solidity wrap on overflow. This can easily result
 * in bugs, because programmers usually assume that an overflow raises an
 * error, which is the standard behavior in high level programming languages.
```

```
* `SafeMath` restores this intuition by reverting the transaction when an
* operation overflows.
*
* Using this library instead of the unchecked operations eliminates an entire
* class of bugs, so it's recommended to use it always.
*/

//SlowMist// OpenZeppelin's SafeMath security module is used, which is a recommend
approach
library SafeMath {
    /**
     * @dev Returns the addition of two unsigned integers, reverting on overflow.
     *
     * Counterpart to Solidity's `+` operator.
     *
     * Requirements:
     * - Addition cannot overflow.
     */
    function add(uint256 a, uint256 b) internal pure returns (uint256) {
        uint256 c = a + b;
        require(c >= a, "SafeMath: addition overflow");

        return c;
    }

    /**
     * @dev Returns the addition of two unsigned integers, reverting with custom
message on overflow.
     *
     * Counterpart to Solidity's `+` operator.
     *
     * Requirements:
     * - Addition cannot overflow.
     */
    function add(uint256 a, uint256 b, string memory errorMessage) internal pure
returns (uint256) {
        uint256 c = a + b;
        require(c >= a, errorMessage);

        return c;
    }

    /**
     * @dev Returns the subtraction of two unsigned integers, reverting on underflow
(when the result is negative).
     *
     * Counterpart to Solidity's `-` operator.
     *
     * Requirements:
     * - Subtraction cannot underflow.
     */
}
```

```

    */
    function sub(uint256 a, uint256 b) internal pure returns (uint256) {
        return sub(a, b, "SafeMath: subtraction underflow");
    }

    /**
     * @dev Returns the subtraction of two unsigned integers, reverting with custom
    message on underflow (when the result is negative).
     *
     * Counterpart to Solidity's `-` operator.
     *
     * Requirements:
     * - Subtraction cannot underflow.
     */
    function sub(uint256 a, uint256 b, string memory errorMessage) internal pure
    returns (uint256) {
        require(b <= a, errorMessage);
        uint256 c = a - b;

        return c;
    }

    /**
     * @dev Returns the multiplication of two unsigned integers, reverting on
    overflow.
     *
     * Counterpart to Solidity's `*` operator.
     *
     * Requirements:
     * - Multiplication cannot overflow.
     */
    function mul(uint256 a, uint256 b) internal pure returns (uint256) {
        // Gas optimization: this is cheaper than requiring 'a' not being zero, but
    the
        // benefit is lost if 'b' is also tested.
        // See: https://github.com/OpenZeppelin/openzeppelin-contracts/pull/522
        if (a == 0) {
            return 0;
        }

        uint256 c = a * b;
        require(c / a == b, "SafeMath: multiplication overflow");

        return c;
    }

    /**
     * @dev Returns the multiplication of two unsigned integers, reverting on
    overflow.

```

```

*
* Counterpart to Solidity's `*` operator.
*
* Requirements:
* - Multiplication cannot overflow.
*/

function mul(uint256 a, uint256 b, string memory errorMessage) internal pure
returns (uint256) {
    // Gas optimization: this is cheaper than requiring 'a' not being zero, but
the
    // benefit is lost if 'b' is also tested.
    // See: https://github.com/OpenZeppelin/openzeppelin-contracts/pull/522
    if (a == 0) {
        return 0;
    }

    uint256 c = a * b;
    require(c / a == b, errorMessage);

    return c;
}

/**
 * @dev Returns the integer division of two unsigned integers.
 * Reverts on division by zero. The result is rounded towards zero.
 *
 * Counterpart to Solidity's `/` operator. Note: this function uses a
 * `revert` opcode (which leaves remaining gas untouched) while Solidity
 * uses an invalid opcode to revert (consuming all remaining gas).
 *
 * Requirements:
 * - The divisor cannot be zero.
 */
function div(uint256 a, uint256 b) internal pure returns (uint256) {
    return div(a, b, "SafeMath: division by zero");
}

/**
 * @dev Returns the integer division of two unsigned integers.
 * Reverts with custom message on division by zero. The result is rounded towards
zero.
 *
 * Counterpart to Solidity's `/` operator. Note: this function uses a
 * `revert` opcode (which leaves remaining gas untouched) while Solidity
 * uses an invalid opcode to revert (consuming all remaining gas).
 *
 * Requirements:
 * - The divisor cannot be zero.
 */

```

```

function div(uint256 a, uint256 b, string memory errorMessage) internal pure
returns (uint256) {
    // Solidity only automatically asserts when dividing by 0
    require(b > 0, errorMessage);
    uint256 c = a / b;
    // assert(a == b * c + a % b); // There is no case in which this doesn't hold

    return c;
}

/**
 * @dev Returns the remainder of dividing two unsigned integers. (unsigned
integer modulo),
 * Reverts when dividing by zero.
 *
 * Counterpart to Solidity's `%` operator. This function uses a `revert`
opcode (which leaves remaining gas untouched) while Solidity uses an
invalid opcode to revert (consuming all remaining gas).
 *
 * Requirements:
 * - The divisor cannot be zero.
 */
function mod(uint256 a, uint256 b) internal pure returns (uint256) {
    return mod(a, b, "SafeMath: modulo by zero");
}

/**
 * @dev Returns the remainder of dividing two unsigned integers. (unsigned
integer modulo),
 * Reverts with custom message when dividing by zero.
 *
 * Counterpart to Solidity's `%` operator. This function uses a `revert`
opcode (which leaves remaining gas untouched) while Solidity uses an
invalid opcode to revert (consuming all remaining gas).
 *
 * Requirements:
 * - The divisor cannot be zero.
 */
function mod(uint256 a, uint256 b, string memory errorMessage) internal pure
returns (uint256) {
    require(b != 0, errorMessage);
    return a % b;
}

contract Uni {
    /// @notice EIP-20 token name for this token
    string public constant name = "Uniswap";

```

```
/// @notice EIP-20 token symbol for this token
string public constant symbol = "UNI";

/// @notice EIP-20 token decimals for this token
uint8 public constant decimals = 18;

/// @notice Total number of tokens in circulation
uint public totalSupply = 1_000_000_000e18; // 1 billion Uni

/// @notice Address which may mint new tokens
address public minter;

/// @notice The timestamp after which minting may occur
uint public mintingAllowedAfter;

/// @notice Minimum time between mints
uint32 public constant minimumTimeBetweenMints = 1 days * 365;

/// @notice Cap on the percentage of totalSupply that can be minted at each mint
uint8 public constant mintCap = 2;

/// @notice Allowance amounts on behalf of others
mapping (address => mapping (address => uint96)) internal allowances;

/// @notice Official record of token balances for each account
mapping (address => uint96) internal balances;

/// @notice A record of each accounts delegate
mapping (address => address) public delegates;

/// @notice A checkpoint for marking number of votes from a given block
struct Checkpoint {
    uint32 fromBlock;
    uint96 votes;
}

/// @notice A record of votes checkpoints for each account, by index
mapping (address => mapping (uint32 => Checkpoint)) public checkpoints;

/// @notice The number of checkpoints for each account
mapping (address => uint32) public numCheckpoints;

/// @notice The EIP-712 typehash for the contract's domain
bytes32 public constant DOMAIN_TYPEHASH = keccak256("EIP712Domain(string
name,uint256 chainId,address verifyingContract)");

/// @notice The EIP-712 typehash for the delegation struct used by the contract
bytes32 public constant DELEGATION_TYPEHASH = keccak256("Delegation(address
delegatee,uint256 nonce,uint256 expiry)");
```



```
/// @notice The EIP-712 typehash for the permit struct used by the contract
bytes32 public constant PERMIT_TYPEHASH = keccak256("Permit(address owner,address
spender,uint256 value,uint256 nonce,uint256 deadline)");

/// @notice A record of states for signing / validating signatures
mapping (address => uint) public nonces;

/// @notice An event thats emitted when the minter address is changed
event MinterChanged(address minter, address newMinter);

/// @notice An event thats emitted when an account changes its delegate
event DelegateChanged(address indexed delegator, address indexed fromDelegate,
address indexed toDelegate);

/// @notice An event thats emitted when a delegate account's vote balance changes
event DelegateVotesChanged(address indexed delegate, uint previousBalance, uint
newBalance);

/// @notice The standard EIP-20 transfer event
event Transfer(address indexed from, address indexed to, uint256 amount);

/// @notice The standard EIP-20 approval event
event Approval(address indexed owner, address indexed spender, uint256 amount);

/**
 * @notice Construct a new Uni token
 * @param account The initial account to grant all the tokens
 * @param minter_ The account with minting ability
 * @param mintingAllowedAfter_ The timestamp after which minting may occur
 */
constructor(address account, address minter_, uint mintingAllowedAfter_) public {
    require(mintingAllowedAfter_ >= block.timestamp, "Uni::constructor: minting
can only begin after deployment");

    balances[account] = uint96(totalSupply);
    emit Transfer(address(0), account, totalSupply);
    minter = minter_;
    emit MinterChanged(address(0), minter);
    mintingAllowedAfter = mintingAllowedAfter_;
}

/**
 * @notice Change the minter address
 * @param minter_ The address of the new minter
 */
//SlowMist// The minter role can transfer the minter role address
function setMinter(address minter_) external {
    require(msg.sender == minter, "Uni::setMinter: only the minter can change the
```

```

minter address");
    emit MinterChanged(minter, minter_);
    minter = minter_;
}

/**
 * @notice Mint new tokens
 * @param dst The address of the destination account
 * @param rawAmount The number of tokens to be minted
 */
//SLOWMIST// The minter role can mint tokens again 365 days after each call to the
mint function, with a maximum amount of 2% of totalSupply each time
function mint(address dst, uint rawAmount) external {
    require(msg.sender == minter, "Uni::mint: only the minter can mint");
    require(block.timestamp >= mintingAllowedAfter, "Uni::mint: minting not
allowed yet");
    require(dst != address(0), "Uni::mint: cannot transfer to the zero address");

    // record the mint
    mintingAllowedAfter = SafeMath.add(block.timestamp, minimumTimeBetweenMints);

    // mint the amount
    uint96 amount = safe96(rawAmount, "Uni::mint: amount exceeds 96 bits");
    require(amount <= SafeMath.div(SafeMath.mul(totalSupply, mintCap), 100),
"Uni::mint: exceeded mint cap");
    totalSupply = safe96(SafeMath.add(totalSupply, amount), "Uni::mint:
totalSupply exceeds 96 bits");

    // transfer the amount to the recipient
    balances[dst] = add96(balances[dst], amount, "Uni::mint: transfer amount
overflows");
    emit Transfer(address(0), dst, amount);

    // move delegates
    _moveDelegates(address(0), delegates[dst], amount);
}

/**
 * @notice Get the number of tokens `spender` is approved to spend on behalf of
`account`
 * @param account The address of the account holding the funds
 * @param spender The address of the account spending the funds
 * @return The number of tokens approved
 */
function allowance(address account, address spender) external view returns (uint)
{
    return allowances[account][spender];
}

```

```

/**
 * @notice Approve `spender` to transfer up to `amount` from `src`
 * @dev This will overwrite the approval amount for `spender`
 * and is subject to issues noted [here](https://eips.ethereum.org/EIPS/eip-
20#approve)
 * @param spender The address of the account which may transfer tokens
 * @param rawAmount The number of tokens that are approved (2^256-1 means
infinite)
 * @return Whether or not the approval succeeded
 */
function approve(address spender, uint rawAmount) external returns (bool) {
    uint96 amount;
    if (rawAmount == uint(-1)) {
        amount = uint96(-1);
    } else {
        amount = safe96(rawAmount, "Uni::approve: amount exceeds 96 bits");
    }

    allowances[msg.sender][spender] = amount;

    emit Approval(msg.sender, spender, amount);
    //SlowMist// The return value conforms to the EIP20 specification
    return true;
}

/**
 * @notice Triggers an approval from owner to spends
 * @param owner The address to approve from
 * @param spender The address to be approved
 * @param rawAmount The number of tokens that are approved (2^256-1 means
infinite)
 * @param deadline The time at which to expire the signature
 * @param v The recovery byte of the signature
 * @param r Half of the ECDSA signature pair
 * @param s Half of the ECDSA signature pair
 */
function permit(address owner, address spender, uint rawAmount, uint deadline,
uint8 v, bytes32 r, bytes32 s) external {
    uint96 amount;
    if (rawAmount == uint(-1)) {
        amount = uint96(-1);
    } else {
        amount = safe96(rawAmount, "Uni::permit: amount exceeds 96 bits");
    }

    bytes32 domainSeparator = keccak256(abi.encode(DOMAIN_TYPEHASH,
keccak256(bytes(name)), getChainId(), address(this)));
    bytes32 structHash = keccak256(abi.encode(PERMIT_TYPEHASH, owner, spender,
rawAmount, nonces[owner]++, deadline));

```

```

        bytes32 digest = keccak256(abi.encodePacked("\x19\x01", domainSeparator,
structHash));
        address signatory = ecrecover(digest, v, r, s);
        require(signatory != address(0), "Uni::permit: invalid signature");
        require(signatory == owner, "Uni::permit: unauthorized");
        require(now <= deadline, "Uni::permit: signature expired");

        allowances[owner][spender] = amount;

        emit Approval(owner, spender, amount);
    }

    /**
     * @notice Get the number of tokens held by the `account`
     * @param account The address of the account to get the balance of
     * @return The number of tokens held
     */
    function balanceOf(address account) external view returns (uint) {
        return balances[account];
    }

    /**
     * @notice Transfer `amount` tokens from `msg.sender` to `dst`
     * @param dst The address of the destination account
     * @param rawAmount The number of tokens to transfer
     * @return Whether or not the transfer succeeded
     */
    function transfer(address dst, uint rawAmount) external returns (bool) {
        uint96 amount = safe96(rawAmount, "Uni::transfer: amount exceeds 96 bits");
        _transferTokens(msg.sender, dst, amount);
        //SlowMist// The return value conforms to the EIP20 specification
        return true;
    }

    /**
     * @notice Transfer `amount` tokens from `src` to `dst`
     * @param src The address of the source account
     * @param dst The address of the destination account
     * @param rawAmount The number of tokens to transfer
     * @return Whether or not the transfer succeeded
     */
    function transferFrom(address src, address dst, uint rawAmount) external returns
(bool) {
        address spender = msg.sender;
        uint96 spenderAllowance = allowances[src][spender];
        uint96 amount = safe96(rawAmount, "Uni::approve: amount exceeds 96 bits");

        if (spender != src && spenderAllowance != uint96(-1)) {
            uint96 newAllowance = sub96(spenderAllowance, amount, "Uni::transferFrom:

```

```

transfer amount exceeds spender allowance");
    allowances[src][spender] = newAllowance;

    emit Approval(src, spender, newAllowance);
}

_transferTokens(src, dst, amount);
//SlowMist// The return value conforms to the EIP20 specification
return true;
}

/**
 * @notice Delegate votes from `msg.sender` to `delegatee`
 * @param delegatee The address to delegate votes to
 */
function delegate(address delegatee) public {
    return _delegate(msg.sender, delegatee);
}

/**
 * @notice Delegates votes from signatory to `delegatee`
 * @param delegatee The address to delegate votes to
 * @param nonce The contract state required to match the signature
 * @param expiry The time at which to expire the signature
 * @param v The recovery byte of the signature
 * @param r Half of the ECDSA signature pair
 * @param s Half of the ECDSA signature pair
 */
function delegateBySig(address delegatee, uint nonce, uint expiry, uint8 v,
bytes32 r, bytes32 s) public {
    bytes32 domainSeparator = keccak256(abi.encode(DOMAIN_TYPEHASH,
keccak256(bytes(name)), getChainId(), address(this)));
    bytes32 structHash = keccak256(abi.encode(DELEGATION_TYPEHASH, delegatee,
nonce, expiry));
    bytes32 digest = keccak256(abi.encodePacked("\x19\x01", domainSeparator,
structHash));
    address signatory = ecrecover(digest, v, r, s);
    require(signatory != address(0), "Uni::delegateBySig: invalid signature");
    require(nonce == nonces[signatory]++, "Uni::delegateBySig: invalid nonce");
    require(now <= expiry, "Uni::delegateBySig: signature expired");
    return _delegate(signatory, delegatee);
}

/**
 * @notice Gets the current votes balance for `account`
 * @param account The address to get votes balance
 * @return The number of current votes for `account`
 */
function getCurrentVotes(address account) external view returns (uint96) {

```

```

uint32 nCheckpoints = numCheckpoints[account];
return nCheckpoints > 0 ? checkpoints[account][nCheckpoints - 1].votes : 0;
}

/**
 * @notice Determine the prior number of votes for an account as of a block number
 * @dev Block number must be a finalized block or else this function will revert
to prevent misinformation.
 * @param account The address of the account to check
 * @param blockNumber The block number to get the vote balance at
 * @return The number of votes the account had as of the given block
 */
function getPriorVotes(address account, uint blockNumber) public view returns
(uint96) {
    require(blockNumber < block.number, "Uni::getPriorVotes: not yet
determined");

    uint32 nCheckpoints = numCheckpoints[account];
    if (nCheckpoints == 0) {
        return 0;
    }

    // First check most recent balance
    if (checkpoints[account][nCheckpoints - 1].fromBlock <= blockNumber) {
        return checkpoints[account][nCheckpoints - 1].votes;
    }

    // Next check implicit zero balance
    if (checkpoints[account][0].fromBlock > blockNumber) {
        return 0;
    }

    uint32 lower = 0;
    uint32 upper = nCheckpoints - 1;
    while (upper > lower) {
        uint32 center = upper - (upper - lower) / 2; // ceil, avoiding overflow
        Checkpoint memory cp = checkpoints[account][center];
        if (cp.fromBlock == blockNumber) {
            return cp.votes;
        } else if (cp.fromBlock < blockNumber) {
            lower = center;
        } else {
            upper = center - 1;
        }
    }
    return checkpoints[account][lower].votes;
}

function _delegate(address delegator, address delegatee) internal {

```

```

        address currentDelegate = delegates[delegator];
        uint96 delegatorBalance = balances[delegator];
        delegates[delegator] = delegatee;

        emit DelegateChanged(delegator, currentDelegate, delegatee);

        _moveDelegates(currentDelegate, delegatee, delegatorBalance);
    }

    function _transferTokens(address src, address dst, uint96 amount) internal {
        require(src != address(0), "Uni::_transferTokens: cannot transfer from the
zero address");
        //SlowMist// It is recommended to add the above line check to avoid user
mistakes leading to the loss of Token
        require(dst != address(0), "Uni::_transferTokens: cannot transfer to the zero
address");

        balances[src] = sub96(balances[src], amount, "Uni::_transferTokens: transfer
amount exceeds balance");
        balances[dst] = add96(balances[dst], amount, "Uni::_transferTokens: transfer
amount overflows");
        emit Transfer(src, dst, amount);

        _moveDelegates(delegates[src], delegates[dst], amount);
    }

    function _moveDelegates(address srcRep, address dstRep, uint96 amount) internal {
        if (srcRep != dstRep && amount > 0) {
            if (srcRep != address(0)) {
                uint32 srcRepNum = numCheckpoints[srcRep];
                uint96 srcRepOld = srcRepNum > 0 ? checkpoints[srcRep][srcRepNum -
1].votes : 0;
                uint96 srcRepNew = sub96(srcRepOld, amount, "Uni::_moveVotes: vote
amount underflows");
                _writeCheckpoint(srcRep, srcRepNum, srcRepOld, srcRepNew);
            }

            if (dstRep != address(0)) {
                uint32 dstRepNum = numCheckpoints[dstRep];
                uint96 dstRepOld = dstRepNum > 0 ? checkpoints[dstRep][dstRepNum -
1].votes : 0;
                uint96 dstRepNew = add96(dstRepOld, amount, "Uni::_moveVotes: vote
amount overflows");
                _writeCheckpoint(dstRep, dstRepNum, dstRepOld, dstRepNew);
            }
        }
    }

    function _writeCheckpoint(address delegatee, uint32 nCheckpoints, uint96

```

```
oldVotes, uint96 newVotes) internal {
    uint32 blockNumber = safe32(block.number, "Uni::_writeCheckpoint: block number
exceeds 32 bits");

    if (nCheckpoints > 0 && checkpoints[delegatee][nCheckpoints - 1].fromBlock ==
blockNumber) {
        checkpoints[delegatee][nCheckpoints - 1].votes = newVotes;
    } else {
        checkpoints[delegatee][nCheckpoints] = Checkpoint(blockNumber, newVotes);
        numCheckpoints[delegatee] = nCheckpoints + 1;
    }

    emit DelegateVotesChanged(delegatee, oldVotes, newVotes);
}

function safe32(uint n, string memory errorMessage) internal pure returns
(uint32) {
    require(n < 2**32, errorMessage);
    return uint32(n);
}

function safe96(uint n, string memory errorMessage) internal pure returns
(uint96) {
    require(n < 2**96, errorMessage);
    return uint96(n);
}

function add96(uint96 a, uint96 b, string memory errorMessage) internal pure
returns (uint96) {
    uint96 c = a + b;
    require(c >= a, errorMessage);
    return c;
}

function sub96(uint96 a, uint96 b, string memory errorMessage) internal pure
returns (uint96) {
    require(b <= a, errorMessage);
    return a - b;
}

function getChainId() internal pure returns (uint) {
    uint256 chainId;
    assembly { chainId := chainid() }
    return chainId;
}
}
```


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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