

Orbital Station Excelsior Smart Contract Security Audit

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Smart Contract Security Audit Start Point

Smart Contract & EVM Compiler Overview

Blockchain: Binance Smart Chain (BSC)

Address: 0x52ABb09Ceb590f04c7d70bE9d6aA420177E94744

Explorer Link: https://bscscan.com/address/0x52abb09ceb590f04c7d70be9d6aa420177e94744

Token Name: BNBDog

Verified: Yes

Status: Deployed

Symbol: (BNBDOG)

Contract Name: BNBDOGToken

Decimals: 18

Total Supply: 1940895167788587613.280391380278395040

Deployment Date: Apr-02-2023 07:07:44 PM +UTC

Compiler Version: v0.8.9+commit.e5eed63a

License Type: MIT license

Optimization: 200 runs

Compiler Settings: default evmVersion, MIT license

Solidity Compiler Bugs for this version:

- AbiReencodingHeadOverflowWithStaticArrayCleanup (medium-severity)
- DirtyBytesArrayToStorage (low-severity)
- DataLocationChangeInInternalOverride (very low-severity)
- NestedCalldataArrayAbiReencodingSizeValidation (very low-severity)

Code language: Solidity

Creator: 0x8e3d11a41d20fff2d5b577ad7327112f2406c289 at txn

0xfa51b595ebac4d783c4d1721ce05b1db86f17c2d4bde4e12f114e34daebc6ca4

Date of audit: 2023/11



EVM Compiler Version Bugs Info

Bug Name: AbiReencodingHeadOverflowWithStaticArrayCleanup

Description: When ABI-encoding a statically-sized calldata array, the compiler always pads the data area to a multiple of 32-bytes and ensures that the padding bytes are zeroed. In some cases, this cleanup used to be performed by always writing exactly 32 bytes, regardless of how many needed to be zeroed. This was done with the assumption that the data that would eventually occupy the area past the end of the array had not yet been written, because the encoder processes tuple components in the order they were given. While this assumption is mostly true, there is an important corner case: dynamically encoded tuple components are stored separately from the statically-sized ones in an area called the *tail* of the encoding and the tail immediately follows the *head*, which is where the statically-sized components are placed. The aforementioned cleanup, if performed for the last component of the head would cross into the tail and overwrite up to 32 bytes of the first component stored there with zeros. The only array type for which the cleanup could actually result in an overwrite were arrays with ''uint256'' or ''bytes32'' as the base element type and in this case the size of the corrupted area was always exactly 32 bytes. The problem affected tuples at any nesting level. This included also structs, which are encoded as tuples in the ABI. Note also that lists of parameters and return values of functions, events and errors are encoded as tuples.

Bug Name: DirtyBytesArrayToStorage

Description: Copying "bytes" arrays from memory or calldata to storage is done in chunks of 32 bytes even if the length is not a multiple of 32. Thereby, extra bytes past the end of the array may be copied from calldata or memory to storage. These dirty bytes may then become observable after a ".push()" without arguments to the bytes array in storage, i.e. such a push will not result in a zero value at the end of the array as expected. This bug only affects the legacy code generation pipeline, the new code generation pipeline via IR is not affected.

Bug Name: DataLocationChangeInInternalOverride

Description: When calling external functions, it is irrelevant if the data location of the parameters is ``calldata`` or ``memory``, the encoding of the data does not change. Because of that, changing the data location when overriding external functions is allowed. The compiler incorrectly also allowed a change in the data location for overriding public and internal functions. Since public functions can be called internally as well as externally, this causes invalid code to be generated when such an incorrectly overridden function is called internally through the base contract. The caller provides a memory pointer, but the called function interprets it as a calldata pointer or viceversa.

Bug Name: NestedCalldataArrayAbiReencodingSizeValidation

Description: Calldata validation for nested dynamic types is deferred until the first access to the nested values. Such an access may for example be a copy to memory or an index or member access to the outer type. While in most such accesses calldata validation correctly checks that the data area of the nested array is completely contained in the passed calldata (i.e. in the range [0, calldatasize()]), this check may not be performed, when ABI encoding such nested types again directly from calldata. For instance, this can happen, if a value in calldata with a nested dynamic array is passed to an external call, used in ``abi.encode`` or emitted as event. In such cases, if the data area of the nested array extends beyond ``calldatasize()``, ABI encoding it did not revert, but continued reading values from beyond ``calldatasize()`` (i.e. zero values).



Code Overview

```
*Submitted for verification at BscScan.com on 2023-04-02
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.9;
// CAUTION
// This version of SafeMath should only be used with Solidity
// because it relies on the compiler's built in overflow checks.
\ast @dev Wrappers over Solidity's arithmetic operations.
* NOTE: `SafeMath` is generally not needed starting with
Solidity 0.8, since the compiler
* now has built in overflow checking.
library SafeMath {
   * @dev Returns the addition of two unsigned integers,
with an overflow flag.
     _Available since v3.4._
  function tryAdd(uint256 a, uint256 b) internal pure returns
(bool, uint256) {
      uint256 c = a + b;
       if (c < a) return (false, 0);
       return (true, c);
  /**
   * @dev Returns the subtraction of two unsigned integers,
with an overflow flag.
     _Available since v3.4._
  function trySub(uint256 a, uint256 b) internal pure returns
(bool, uint256) {
       if (b > a) return (false, 0):
       return (true, a - b);
   * @dev Returns the multiplication of two unsigned inte-
gers, with an overflow flag.
   * _Available since v3.4._
  function tryMul(uint256 a, uint256 b) internal pure returns
(bool, 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/openzeppe-
lin-contracts/pull/522
       if (a == 0) return (true, 0);
       uint256 c = a * b;
        \textbf{if} \ (c \ / \ a \ != b) \ \textbf{return} \ (\textbf{false}, \ 0); \\
    return (true, c):
```

```
* @dev Returns the division of two unsigned integers,
with a division by zero flag.
    _Available since v3.4._
  function tryDiv(uint256 a, uint256 b) internal pure returns
(bool, uint256) {
      if (b == 0) return (false, 0);
       return (true, a / b);
  /**
  * @dev Returns the remainder of dividing two unsigned
integers, with a division by zero flag.
    _Available since v3.4._
  function tryMod(uint256 a, uint256 b) internal pure returns
(bool, uint256) {
       if (b == 0) return (false, 0);
       return (true, a % b);
  * @dev Returns the addition of two unsigned integers, re-
verting on
  * overflow.
  * Counterpart to Solidity's `+` operator.
   * Requirements:
   * - Addition cannot overflow.
  function add(uint256 a, uint256 b) internal pure returns
(uint256) {
    return a + b;
  * @dev Returns the subtraction of two unsigned integers,
reverting on
  * overflow (when the result is negative).
   * Counterpart to Solidity's `-` operator.
   * Requirements:
  * - Subtraction cannot overflow.
  function sub(uint256 a, uint256 b) internal pure returns
(uint256)
  * @dev Returns the multiplication of two unsigned inte-
gers, reverting on
  * overflow.
  * Counterpart to Solidity's `*` operator.
```



```
* Requirements:
   * - Multiplication cannot overflow.
  function mul(uint256 a, uint256 b) internal pure returns
(uint256) {
    return a * b;
   * @dev Returns the integer division of two unsigned inte-
   * division by zero. The result is rounded towards zero.
   * Counterpart to Solidity's `/` operator.
   * Requirements:
   * - The divisor cannot be zero.
  function div(uint256 a, uint256 b) internal pure returns
(uint256) {
   * @dev Returns the remainder of dividing two unsigned
integers. (unsigned integer modulo),
  * reverting 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) {
  /**
  * @dev Returns the subtraction of two unsigned integers,
reverting with custom message on
   * overflow (when the result is negative).
   * CAUTION: This function is deprecated because it re-
quires allocating memory for the error
   * message unnecessarily. For custom revert reasons use
{trySub}.
   * Counterpart to Solidity's `-` operator.
   * Requirements:
  * - Subtraction cannot overflow.
  function sub(uint256 a, uint256 b, string memory er-
rorMessage) internal pure returns (uint256) {
    unchecked {
       require(b <= a, errorMessage);</pre>
       return a - b;
```

```
* @dev Returns the integer division of two unsigned inte-
gers, reverting with custom message on
   * division by zero. The result is rounded towards zero.
  * Counterpart to Solidity's `/ operator. Note: this function
   * `revert` opcode (which leaves remaining gas untouched)
while Solidity
  * uses an invalid opcode to revert (consuming all remain-
ing gas).
   * Requirements:
  * - The divisor cannot be zero.
  function div(uint256 a, uint256 b, string memory er-
rorMessage) internal pure returns (uint256) {
       require(b > 0, errorMessage);
  /**
  * @dev Returns the remainder of dividing two unsigned
integers. (unsigned integer modulo),
   * reverting with custom message when dividing by zero.
   * CAUTION: This function is deprecated because it re-
quires allocating memory for the error
   * message unnecessarily. For custom revert reasons use
{tryMod}.
   * Counterpart to Solidity's `%` operator. This function
   * 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 er-
rorMessage) internal pure returns (uint256) {
       require(b > 0, errorMessage);
       return a % b;
* @dev Collection of functions related to the address type
library Address {
  /**
  * @dev Returns true if `account` is a contract.
  * [IMPORTANT]
  * It is unsafe to assume that an address for which this
function returns
   * false is an externally-owned account (EOA) and not a
   * Among others, `isContract` will return false for the fol-
lowing
  * types of addresses:
```



```
* - an externally-owned account
   * - a contract in construction
   * - an address where a contract will be created
   * - an address where a contract lived, but was destroyed
   * Furthermore, `isContract` will also return true if the tar-
get contract within
   * the same transaction is already scheduled for destruction
by `SELFDESTRUCT`,
   * which only has an effect at the end of a transaction.
   * [IMPORTANT]
   * You shouldn't rely on `isContract` to protect against
flash loan attacks!
   * Preventing calls from contracts is highly discouraged. It
breaks composability, breaks support for smart wallets
   * like Gnosis Safe, and does not provide security since it
can be circumvented by calling from a contract
   * constructor.
   */
  function isContract(address account) internal view returns
(bool)
     // This method relies on extcodesize/ad-
dress.code.length, which returns 0
     // for contracts in construction, since the code is only
stored at the end
    // of the constructor execution.
  /**
   * @dev Replacement for Solidity's `transfer`: sends
`amount` wei to
   * 'recipient', forwarding all available gas and reverting on
errors.
   * https://eips.ethereum.org/EIPS/eip-1884[EIP1884] in-
creases the gas cost
   * of certain opcodes, possibly making contracts go over
the 2300 gas limit
   * imposed by `transfer`, making them unable to receive
funds via
   * `transfer`. {sendValue} removes this limitation.
   * https://consensys.net/diligence/blog/2019/09/stop-using-
soliditys-transfer-now/[Learn more].
   * IMPORTANT: because control is transferred to `recipi-
ent`, care must be
   * taken to not create reentrancy vulnerabilities. Consider
   * {ReentrancyGuard} or the
   * https://solidity.readthedocs.io/en/v0.5.11/security-con-
siderations.html#use-the-checks-effects-interactions-pat-
tern[checks-effects-interactions pattern].
  function sendValue(address payable recipient, uint256
     require(address(this).balance >= amount, "Address: in-
sufficient balance");
     (bool success, ) = recipient.call{value: amount}("")
```

```
* @dev Performs a Solidity function call using a low level
   * plain `call` is an unsafe replacement for a function call:
use this
   * function instead.
   * If `target` reverts with a revert reason, it is bubbled up
   * function (like regular Solidity function calls).
   * Returns the raw returned data. To convert to the ex-
   * use https://solidity.readthedocs.io/en/latest/units-and-
global-variables.html?highlight=abi.decode#abi-encoding-
and-decoding-functions[`abi.decode`].
   * Requirements:
   * - `target` must be a contract.
   * - calling `target` with `data` must not revert.
   * _Available since v3.1._
   */
  function functionCall(address target, bytes memory data)
internal returns (bytes memory)
     return functionCallWithValue(target, data, 0, "Address:
low-level call failed");
   * @dev Same as {xref-Address-functionCall-address-
bytes-}[`functionCall`], but with
   * `errorMessage` as a fallback revert reason when `target`
reverts.
     _Available since v3.1._
  function functionCall(
     address target.
     bytes memory data,
     string memory errorMessage
  ) internal returns (bytes memory)
    return functionCallWithValue(target, data, 0, er-
  /**
   * @dev Same as {xref-Address-functionCall-address-
bytes-}[`functionCall`],
   * but also transferring `value` wei to `target`.
   * Requirements:
   * - the calling contract must have an ETH balance of at
least `value`.
   * - the called Solidity function must be `payable`.
   * _Available since v3.1._
  function functionCallWithValue(address target, bytes
memory data, uint256 value) internal returns (bytes memory)
     return functionCallWithValue(target, data, value, "Ad-
dress: low-level call with value failed");
```

ent may have reverted");

require(success, "Address: unable to send value, recipi-



```
* @dev Same as {xref-Address-functionCallWithValue-
address-bytes-uint256-}[`functionCallWithValue`], but
       * with `errorMessage` as a fallback revert reason when
`target` reverts.
       * _Available since v3.1._
     function functionCallWithValue(
           address target,
           bytes memory data,
           uint256 value,
           string memory errorMessage
     ) internal returns (bytes memory) {
           require(address(this).balance >= value, "Address: insuf-
ficient balance for call"
            (bool success, bytes memory returndata) = tar-
     /**
      * @dev Same as {xref-Address-functionCall-address-
bytes-}[`functionCall`],
      * but performing a static call.
           _Available since v3.3._
     function functionStaticCall(address target, bytes memory
data) internal view returns (bytes memory)
       return functionStaticCall(target, data, "Address: low-
level static call failed");
     /**
      * @dev Same as {xref-Address-functionCall-address-
bytes-string-}[`functionCall`],
       * but performing a static call.
           _Available since v3.3._
     function functionStaticCall(
          address target.
           bytes memory data,
           string memory errorMessage
     ) internal view returns (bytes memory) {
           (bool success, bytes memory returndata) = target.stat-
          return\ verify Call Result From Target (target, success, results) and the property of the pr
     /**
      * @dev Same as {xref-Address-functionCall-address-
bytes-}[`functionCall`],
       * but performing a delegate call.
       * _Available since v3.4._
     function functionDelegateCall(address target, bytes
memory data) internal returns (bytes memory)
          return functionDelegateCall(target, data, "Address: low-
level delegate call failed");
      * @dev Same as {xref-Address-functionCall-address-
bytes-string-}[`functionCall`],
      * but performing a delegate call.
```

```
*_Available since v3.4._
*/
  function functionDelegateCall(
    address target.
    bytes memory data,
    string memory errorMessage
  ) internal returns (bytes memory) {
    (bool success, bytes memory returndata) = target.delega-
  /**
  * @dev Tool to verify that a low level call to smart-con-
tract was successful, and revert (either by bubbling
   * the revert reason or using the provided one) in case of
unsuccessful call or if target was not a contract.
   * _Available since v4.8._
  function verifyCallResultFromTarget(
    address target,
    bool success.
    bytes memory returndata,
    string memory errorMessage
  ) internal view returns (bytes memory) {
         // only check isContract if the call was successful
and the return data is empty
         // otherwise we already know that it was a contract
         require(isContract(target), "Address: call to non-
contract");
  * @dev Tool to verify that a low level call was successful,
and revert if it wasn't, either by bubbling the
  * revert reason or using the provided one.
     _Available since v4.3._
  function verifyCallResult(
    bool success,
    bytes memory returndata,
    string memory errorMessage
  ) internal pure returns (bytes memory) {
  function _revert(bytes memory returndata, string memory
    // Look for revert reason and bubble it up if present
       // The easiest way to bubble the revert reason is using
memory via assembly
       /// @solidity memory-safe-assembly
         let returndata_size := mload(returndata)
```

revert(add(32, returndata), returndata_size)



```
* @dev Sets `amount` as the allowance of `spender` over
                                                                       the caller's tokens.
       revert(errorMessage);
* @dev Interface of the ERC20 standard as defined in the
*/
 /**
                                                                       and set the
   * @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.
                                                                       the caller's
  event Approval(address indexed owner, address indexed
spender, uint256 value);
  /**
   * @dev Returns the amount of tokens in existence.
  function totalSupply() external view returns (uint256);
   * @dev Returns the amount of tokens owned by `ac-
count`.
  function balanceOf(address account) external view returns
(uint256):
   * @dev Moves `amount` tokens from the caller's account
   * Returns a boolean value indicating whether the opera-
tion succeeded.
   * Emits a {Transfer} event.
  function transfer(address to, uint256 amount) external re-
turns (bool):
   * @dev Returns the remaining number of tokens that
                                                                         /**
`spender` will be
   * allowed to spend on behalf of `owner` through {trans-
ferFrom \}. This is
   * zero by default.
   * This value changes when {approve} or {transferFrom}
are called.
   */
  function allowance(address owner, address spender) exter-
nal view returns (uint256);
```

```
* Returns a boolean value indicating whether the opera-
   * IMPORTANT: Beware that changing an allowance with
this method brings the risk
   * that someone may use both the old and the new allow-
ance by unfortunate
   * transaction ordering. One possible solution to mitigate
   * condition is to first reduce the spender's allowance to 0
   * desired value afterwards:
   * https://github.com/ethereum/EIPs/issues/20#issuecom-
ment-263524729
  * Emits an {Approval} event.
  function approve(address spender, uint256 amount) exter-
nal returns (bool);
  * @dev Moves `amount` tokens from `from` to `to` using
  * allowance mechanism. `amount` is then deducted from
  * allowance.
  * Returns a boolean value indicating whether the opera-
tion succeeded.
  * Emits a {Transfer} event.
  function transferFrom(address from, address to, uint256
amount) external returns (bool);
* @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 gen-
erally available
```



```
* via msg.sender and msg.data, they should not be accessed
in such a direct
* manner, since when dealing with meta-transactions the ac-
count 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 (ad-
dress) {
     return msg.sender;
  function _msgData() internal view virtual returns (bytes
    return msg.data;
* @dev Contract module which provides a basic access con-
trol mechanism, where
* there is an account (an owner) that can be granted exclu-
sive 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 re-
strict their use to
* the owner.
abstract contract Ownable is Context {
  address private _owner:
  event OwnershipTransferred(address indexed previ-
ousOwner, address indexed newOwner);
   * @dev Initializes the contract setting the deployer as the
initial owner.
   */
  constructor() {
   * @dev Throws if called by any account other than the
owner.
   */
  modifier onlyOwner() {
  /**
   * @dev Returns the address of the current owner.
  function owner() public view virtual returns (address) {
```

```
/**
  * @dev Throws if the sender is not the owner.
  function _checkOwner() internal view virtual
    require(owner() == _msgSender(), "Ownable: caller is
not the owner"):
  * @dev Leaves the contract without owner. It will not be
   * `onlyOwner` functions. Can only be called by the cur-
rent owner.
   * NOTE: Renouncing ownership will leave the contract
without an owner.
   * thereby disabling 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 ac-
count ('newOwner').
  * Can only be called by the current owner.
  function transferOwnership(address newOwner) public vir-
tual onlyOwner
    require(newOwner != address(0), "Ownable: new owner
is the zero address"):
  /**
  * @dev Transfers ownership of the contract to a new ac-
count ('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 cre-
ated. This means
* that a supply mechanism has to be added in a derived con-
tract using {_mint}.
* For a generic mechanism see {ERC20PresetMin-
terPauser}.
* TIP: For a detailed writeup see our guide
* https://forum.openzeppelin.com/t/how-to-implement-
erc20-supply-mechanisms/226[How
* to implement supply mechanisms].
* The default value of {decimals} is 18. To change this, you
* this function so it returns a different value.
* We have followed general OpenZeppelin Contracts guide-
```

lines: functions revert



```
* instead returning `false` on failure. This behavior is none-
* 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 {in-
creaseAllowance)
 * functions have been added to mitigate the well-known is-
sues around setting
* allowances. See {IERC20-approve}.
contract ERC20 is Context, IERC20, IERC20Metadata {
  using SafeMath for uint256;
  using Address for address
  mapping(address => uint256) private _balances:
  mapping(address => mapping(address => uint256)) private
  uint256 private _totalSupply;
  string private _name;
  string private _symbol;
   * @dev Sets the values for {name} and {symbol}.
   * All two of these values are immutable: they can only be
set once during
   * construction.
   */
  constructor(string memory name_, string memory sym-
    _name = name_
     _symbol = symbol_:
  /**
   * @dev Returns the name of the token.
   */
  function name() public view virtual override returns (string
memory) {
  /**
   * @dev Returns the symbol of the token, usually a shorter
version of the
   * name.
  function symbol() public view virtual override returns
(string memory)
   * @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 rela-
tionship between
   * Ether and Wei. This is the default value returned by this
function, unless
   * it's overridden.
   * NOTE: This information is only used for _display_ pur-
   * no way affects any of the arithmetic of the contract, in-
cluding
   * {IERC20-balanceOf} and {IERC20-transfer}.
  function decimals() public view virtual override returns
  /**
   * @dev See {IERC20-totalSupply}.
  function totalSupply() public view virtual override returns
(uint256)
  /**
   * @dev See {IERC20-balanceOf}.
  function balanceOf(address account) public view virtual
override returns (uint256)
   * @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();
    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 al-
lowance is not updated on
   * `transferFrom`. This is semantically equivalent to an in-
finite 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);
    return true:
   * @dev See {IERC20-transferFrom}.
   * Emits an {Approval} event indicating the updated al-
lowance. This is not
   * required by the EIP. See the note at the beginning of
{ERC20}.
   * NOTE: Does not update the allowance if the current al-
lowance
   * 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);\\
    return true;
  /**
   * @dev Atomically increases the allowance granted to
`spender` by the caller.
   * This is an alternative to {approve} that can be used as a
mitigation for
   * problems described in {IERC20-approve}.
   * Emits an {Approval} event indicating the updated al-
lowance.
   * Requirements:
   \ast - `spender` cannot be the zero address.
  function increaseAllowance(address spender, uint256 add-
edValue) public virtual returns (bool) {
    address\ owner = \_msgSender();
    return true
   * @dev Atomically decreases the allowance granted to
'spender' by the caller.
   * This is an alternative to {approve} that can be used as a
mitigation for
   * problems described in {IERC20-approve}.
   * Emits an {Approval} event indicating the updated al-
```

```
* Requirements:
   * - `spender` cannot be the zero address.
  * - `spender` must have allowance for the caller of at least
  * `subtractedValue`.
  function decreaseAllowance(address spender, uint256 sub-
tractedValue) public virtual returns (bool) {
    address owner = _msgSender()
    uint256 currentAllowance = allowance(owner, spender);
    require(currentAllowance >= subtractedValue, "ERC20:
decreased allowance below zero");
        _approve(owner, spender, currentAllowance - sub-
    return true:
   * @dev Moves `amount` of tokens from `from` to `to`.
  * This internal function is equivalent to {transfer}, and
can be used to
   * e.g. implement automatic token fees, slashing mecha-
nisms, 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
    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"):
       // Overflow not possible: the sum of all balances is
capped by totalSupply, and the sum is preserved by
       // decrementing then incrementing.
        _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 ad-
dress.
```

* Requirements:



```
* - `account` cannot be the zero address.
  function _mint(address account, uint256 amount) internal
    require(account != address(0), "ERC20: mint to the zero
address");
     _beforeTokenTransfer(address(0), account, amount);
       // Overflow not possible: balance + amount is at most
totalSupply + amount, which is checked above.
        _balances[account] += amount;
    emit Transfer(address(0), account, amount);
     _afterTokenTransfer(address(0), account, amount);
  /**
   * @dev Destroys `amount` tokens from `account`, reduc-
ing the
   * total supply.
   * Emits a {Transfer} event with `to` set to the zero ad-
   * Requirements:
   \ast - `account` cannot be the zero address.
   * - `account` must have at least `amount` tokens.
  function _burn(address account, uint256 amount) internal
    require(account != address(0), "ERC20: burn from the
zero address");
     _beforeTokenTransfer(account, address(0), amount);
    uint256 accountBalance = _balances[account];
    require(accountBalance >= amount, "ERC20: burn
amount exceeds balance");
       // Overflow not possible: amount <= accountBalance
<= totalSupply.
       _totalSupply -= amount;
    emit Transfer(account, address(0), amount);
     _afterTokenTransfer(account, address(0), 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,
   * 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"):
    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: insuf-
ficient allowance"):
          _approve(owner, spender, currentAllowance
  * @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:extend-
ing-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:extend-
ing-contracts.adoc#using-hooks[Using Hooks].
  function _afterTokenTransfer(address from, address to,
uint256 amount) internal virtual {}
contract BNBDOGToken is ERC20, Ownable {
  constructor()\ ERC20("BNBDog",\ "BNBDOG")\ \{
     _mint(msg.sender, 2000000000000000000 * 10 ** deci-
  uint256 public transferBurnRate = 3;
  mapping(address => bool) private _transferBurnEx-
   * @dev Moves tokens `amount` from `sender` to `recipi-
   * This is internal function is equivalent to {transfer}, and
   * e.g. implement automatic token fees, slashing mecha-
nisms, etc.
   * Emits a {Transfer} event.
   * Requirements:
   * - `sender` cannot be the zero address.
   * - `recipient` cannot be the zero address.
   * - `sender` must have a balance of at least `amount`.
  function _transfer(address sender, address recipient,
uint256 amount) internal virtual override
    if (transferBurnRate > 0 && _transferBurnEx-
ceptAddresses[sender] != true && _transferBurnEx-
ceptAddresses[recipient] != true && recipient != address(0))
       uint256 _burntAmount = amount * transferBurnRate
       // Burn transferBurnRate% from amount
       super._burn(sender, _burntAmount);
```

```
super._transfer(sender, recipient, amount);
  * @dev Destroys `amount` tokens from the caller.
  * See {ERC20-_burn}.
  function burn(uint256 amount) public virtual
    _burn(_msgSender(), amount);
   * @dev Destroys `amount` tokens from `account`, deduct-
ing from the caller's
   * allowance.
  * See {ERC20-_burn} and {ERC20-allowance}.
   * Requirements:
  * - the caller must have allowance for ``accounts``'s to-
kens of at least
   * `amount`.
  function burnFrom(address account, uint256 amount) pub-
     _spendAllowance(account, _msgSender(), amount);
     _burn(account, amount);
  function addTransferBurnExceptAddress(address_trans-
ferBurnExceptAddress) public onlyOwner {
    require(_transferBurnExceptAddress != address(0).
"cannot be the zero address"):
ceptAddress] = true;
  function \ remove Transfer Burn Except Address (address
require(_transferBurnExceptAddress != address(0),
"cannot be the zero address");
    delete _transferBurnExceptAddresses[_transferBurnEx-
```

// Recalibrate the transfer amount

Analysis: Basic Coding Bugs

1. Semantic Consistency Checks

- Description: Whether the semantic of the white paper is different from the implementation of the contract.
- Result: Not foundSeverity: Critical

2. Redundant Fallback Function

- Description: Whether the contract has a redundant fallback function.
- Result: Not foundSeverity: Critical

3. Constructor Mismatch

- Description: Whether the contract name and its constructor are not identical to each other.
- Result: Not foundSeverity: Critical

4. Ownership Takeover

- Description: Whether the set owner function is not protected.
- Result: Not foundSeverity: Critical

5. Overflows & Underflows

- Description: Whether the contract has general overflow o underflow vulnerabilities.
- Result: Not foundSeverity: Critical

6. Reentrancy

- Description: Reentrancy is an issue when code can call back into your contract and change state, such as withdrawing ETHs.
- Result: Not foundSeverity: Critical

7. Blackhole

- Description: Whether the contract locks ETH indefinitely: merely in without out.
- Result: Not foundSeverity: High

8. Money-Giving Bug

- Description: Whether the contract returns funds to an arbitrary address.
- Result: Not foundSeverity: High

9. Unauthorized Self-Destruct

- Description: Whether the contract can be killed by any arbitrary address.
- Result: Not foundSeverity: Medium

10. Unchecked External Call

- Description: Whether the contract has any external call without checking the return value.
- Result: Not foundSeverity: Medium

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11. Revert DoS

- Description: Whether the contract is vulnerable to DoS attack because of unexpected revert.
- Result: Not foundSeverity: Medium

12. Gasless Send

- Description: Whether the contract is vulnerable to gasless send.
- Result: Not foundSeverity: Medium

13. Send Instead Of Transfer

- Description: Whether the contract uses send instead of transfer.
- Result: Not foundSeverity: Medium

14. Use Of Untrusted Libraries

- Description: Whether the contract use any suspicious libraries.
- Result: Not foundSeverity: Medium

15. Costly Loop

- Description: Whether the contract has any costly loop which may lead to Out-Of-Gas exception.
- Result: Not foundSeverity: Medium

16. Use Of Predictable Variables

- Description: Whether the contract contains any randomness variable, but its value can be predicated.
- Result: Not found
- Severity: Medium

17. Deprecated Uses

- Description: Whether the contract use the deprecated Tx. Origin to perform the authorization.
- · Result: Not found
- Severity: Medium

18. Transaction Ordering Dependence

- Description: Whether the final state of the contract depends on the order of the transactions.
- · Result: Not found
- Severity: Medium

19. Make Type Inference Explicit

- Description: Do not use keyword var to specify the type, i.e., it asks the compiler to deduce the type, which is not safe especially in a loop.
- Result: Not foundSeverity: Low

20. Make Visibility Level Explicit

- Description: Assign explicit visibility specifiers for functions and state variables.
- Result: Not found
- Severity: Low

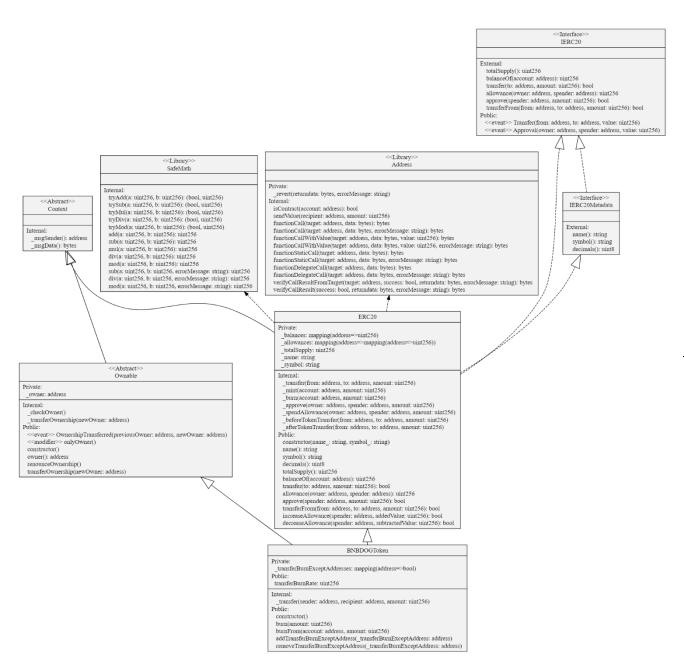
21. Avoid Use of Variadic Byte Array

- Description: Use fixed-size byte array is better than that of byte, a the latter is a waste of space.
- Result: Not found
- Severity: Low

16



Analysis: Smart Contract Functions Scheme





Analysis: Smart Contract Vulnerability Check

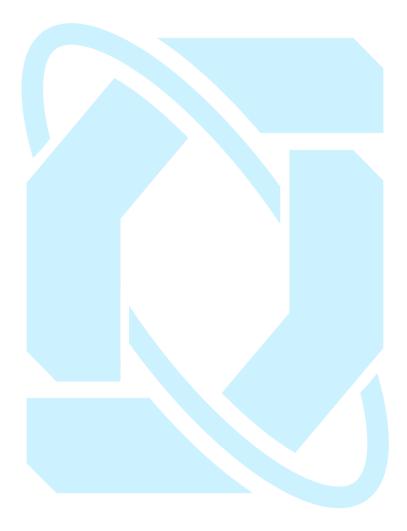
Fallback function security	Passed
Design logic	Passed
Economy model	Passed
Oracle calls	Passed
Timestamp dependence	Passed
Compiler warnings.	Passed
Methods execution permissions	Passed
Arithmetic accuracy	Passed
Scoping and declarations	Passed
Economy model	Passed
Safe Zeppelin module	Passed
Cross-function race conditions	Passed
Race conditions and reentrancy.	Passed
Cross-function	Passed
Integer overflow and underflow	Passed
Malicious Event log	Passed
Uninitialized storage pointers	Passed
DoS with Revert	Passed
DoS with block gas limit	Passed
Private user data leaks	Passed
Impact of the exchange rate on the logic	Passed
Front running	Passed
Possible delays in data delivery	Passed



Summary

In this audit, we thoroughly analyzed the BNB DOGE INU design and implementation. The smart-contract presents a unique offering in current BSC ecosystem. We are truly impressed by the design and implementation, especially the dedication to maximized gas optimization. The current code base is well organized and those identified issues are promptly confirmed and fixed.

Meanwhile, we need to emphasize that smart contracts as a whole are still in an early, but exciting stage of development. To improve this report, we greatly appreciate any constructive feedbacks or suggestions, on our methodology, audit findings, or potential gaps in scope/coverage.





Disclaimer

The following disclaimer outlines the terms and conditions that govern the use of our blockchain smart contract security audit services. By engaging our services, you accept and agree to be bound by these terms and conditions.

- 1. The purpose of this security audit is to assess the security measures implemented in the smart contract on the blockchain network. Our services are provided on an "as is" basis. We do not guarantee that our services will be error-free or uninterrupted, or that any defects will be corrected.
- 2. The security audit focuses solely on the smart contract code and its implementation within the blockchain network. It does not cover any external systems, applications, or third-party integrations that may interact with the contract. We do not accept any liability for any damages or losses arising from the use of our services, including but not limited to loss of profits, data, or business interruption.
- 3. Our services do not constitute legal, financial, or investment advice. We do not provide any warranties or representations as to the accuracy, completeness, or reliability of the information provided in our reports.
- 4. Orbital Station Excelsior strives to maintain independence and objectivity throughout the security audit process. However, it is important to acknowledge that no audit can be completely free from biases or conflicts of interest. Our services are limited to the scope of work agreed upon with the client. We are not responsible for any issues that fall outside of this scope, including but not limited to issues arising from third-party software or hardware.
- 5. Our services do not guarantee the security of the smart contract or the blockchain network. We provide recommendations based on our expertise, but it is ultimately the responsibility of the client to ensure the security of their smart contract and blockchain network. The security audit report may include recommendations and suggestions for improving the smart contract's security. It is essential to understand that implementing these recommendations does not guarantee absolute security, as new vulnerabilities may emerge over time.
- 6. Security threats and vulnerabilities evolve over time. Therefore, it is crucial to continuously monitor and update the smart contract's security measures even after the completion of the audit. Regular security assessments are recommended to ensure ongoing protection.
- 7. We reserve the right to refuse service to anyone at any time for any reason.

First of all, it is important to note that no security audit can guarantee complete protection against all potential vulnerabilities. While we aim to identify and report any security flaws and vulnerabilities in the smart contract as thoroughly as possible, it is inevitable that some risks may remain undisclosed or may develop over time. Therefore, any use or reliance on the security audit report for the smart contract is done at your own risk.

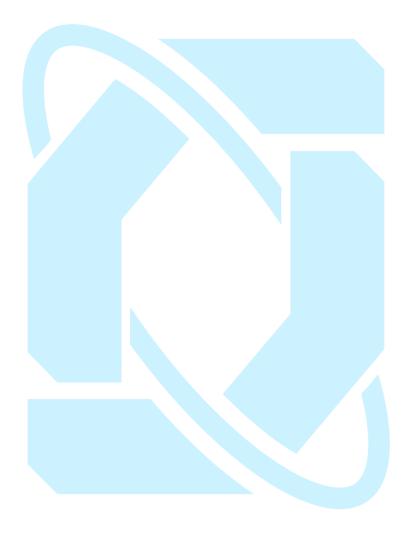
Furthermore, the security audit report is based on the information provided to us at the time of the audit. Any subsequent changes, modifications or updates made to the smart contract without our knowledge may affect the security of the contract and therefore invalidate our report.



In conclusion, our blockchain smart contract security audit services are provided with the understanding that we are not liable for any damages or losses arising from their use. We recommend that clients seek legal and financial advice before engaging in any blockchain-related activities.

If you have any questions or concerns regarding this disclaimer or the security audit process, please contact auditkyc@osexnetwork.com for further clarification.

Smart Contract Security Audit End Point





About Orbital Station Excelsior (OSEX)

The Orbital Station Excelsior (OSEX) is an international community aimed to bring real benefits to the real world with the help of blockchain technologies, providing all possible assistance and giving hope where it no longer exists.

Our slogan - make the world better together! We do not focus on one blockchain, we use them all, using bridges, Web 3 applications, decentralized exchanges, related technologies and a financial system. We are not an official accountable government financial organization; the main mechanism of our smart contracts is the accumulation of funds, with their subsequent use for charitable needs and purposes around the whole world, as well as expanding the influence of our community on social networks and other Internet platforms. The 21st century is not only about discoveries and achievements in the IT field, but it is also the century of widespread use of these innovations. Blockchain technologies allow us to redirect money flows from one place to another without any intermediaries in the form of banks. The future belongs to electronic money, and Blockchain is the future!

OSEX aims to integrate the advantages of multiple chains to create a high-performance compound ecology. The special redistribution to all holders mechanism of smart-contract from every transaction provides participants with maximum profit. The transaction fee for OSEX includes an active burn mechanism that ensures that the token deflates, which means the price of the token increases over time.

All used DEX strives to provide one-stop liquidity services for more high-quality assets and brings users a safe, reliable, diversified and cost-effective transaction experience.

OSEX-project will build a new business ecology with full application scenarios covered and various chains connected. It will continue to expand application scenarios and lower the usage threshold to provide global users with more convenient, high-performance, low-cost and non-differentiated crypto-asset financial services, thereby realizing fair pricing of assets, instant settlement of transactions and free flow of values.

This project allows all holders to obtain benefits, and is also set to interact with the community. The Orbital Station Excelsior will allow participants to choose the direction of the project. Our beginning includes many opportunities for a crypto project to meet the real world. For example, 1% of each transaction will go to a special charity wallet. Cash income received from this wallet will be sent to charitable projects around the world (rescue funds, volunteer organizations, international movements, environmental protection, etc.). We guarantee to provide reports and proofs of our activities.

The Smart contract security audit and KYC department is an independent department in the general structure of the Orbital Station Excelsior project. Department employees report directly to the general director for their work.

The project was founded on November 07, 2021.



Contacts and links

Orbital Station Excelsior (OSEX)

Website: https://osexnetwork.com/

E-mail:

osex.owner@gmail.com (for advertising and commercial questions) auditkyc@osexnetwork.com (for smart contract security audit or team KYC requests)

Official Twitter profile: https://twitter.com/OSEXNetwork

Telegram chat group: https://t.me/osex chat

Telegram announcements channel: https://t.me/osex announcements

Telegram RU chat group: https://t.me/osex_chat_ru Telegram NG chat group: https://t.me/osex_chat_ng

Telegram contact (for private dialog): https://t.me/osex_support

We are on blockchain:

https://blockscan.com/address/0x42614e5acf9c084a8afdff402ecd89d19f675c00

Smart contract address (BSC): 0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00
Smart contract address (Avalanche): 0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00
Smart contract address (Cronos): 0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00
Smart contract address (Polygon): 0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00

Smart contract address (Huobi ECO Chain): 0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00

Smart contract address (Moonbeam): 0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00 Smart contract address (Fantom): 0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00

Contract code on block explorers:

https://bscscan.com/address/0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00#code https://snowtrace.io/address/0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00#code https://cronoscan.com/address/0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00#code https://polygonscan.com/address/0x42614E5ACf9c084a8aFDfF402eCD89d19F675c00#code https://moonbeam.moonscan.io/address/0x42614e5acf9c084a8afdff402ecd89d19f675c00#code https://moonbeam.moonscan.io/address/0x42614e5acf9c084a8afdfff402ecd89d19f675c00#code https://moonbeam.moonscan.io/add

https://ftmscan.com/address/0x42614e5acf9c084a8afdff402ecd89d19f675c00#code

https://www.hecoinfo.com/en-

us/token/0x42614e5acf9c084a8afdff402ecd89d19f675c00?tab=Transfers

Discord: https://discord.gg/4uPVcyen8Z

GitHub: https://github.com/OrbitalStationExcelsior Instagram: https://www.instagram.com/osexnetwork/

Youtube: https://www.youtube.com/channel/UCm5QiJSu9rySS15arUXZbpw

GitBook: https://osex.gitbook.io/docs/

Medium: https://medium.com/@OrbitalStationExcelsior

Reddit: https://www.reddit.com/r/OSEX/

Techrate free audit for BSC:

https://drive.google.com/file/d/17lO8y0qELM8yhm7iXKXGPyc0NrjXeJOU

Dev Linkedin: https://www.linkedin.com/in/valdisveiss

Whitepaper: https://osexnetwork.com/OSEX Whitepaper.pdf



Report

I hereby confirm the full implementation of the order from representatives of the «BNB DOG INU» team regarding the security audit of this smart contract: (BNBDOGToken 0x52ABb09Ceb590f04c7d70bE9d6aA420177E94744)

