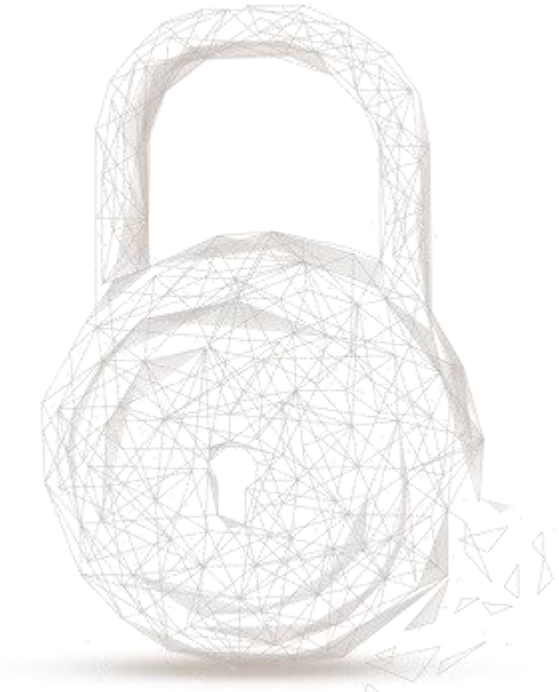
成都链安
BEOSIN

智能合约安全审计报告



审计编号： 202502031040

审计合约名称：

GDA(GDA)

审计合约地址：

0xF7af106c717f3207E642257ACCd258FCDa4F3C7B

审计合约链接地址：

https://bscscan.com/address/0xF7af106c717f3207E642257ACCd258FCDa4F3C7B

合约审计开始日期： 2025.07.22

合约审计完成日期： 2025.07.23

审计结果：通过(优)

审计团队：成都链安科技有限公司

审计类型及结果：

序号	审计类型	审计子项	审计结果
1	代码规范审计	BEP-20 Token 标准规范审计	通过
		编译器版本安全审计	通过
		可见性规范审计	通过
		能量消耗审计	通过
		SafeMath 功能审计	通过
		fallback 函数使用审计	通过
		tx.origin 使用审计	通过
		弃用项审计	通过
		冗余代码审计	通过
		变量覆盖审计	通过
2	函数调用审计	函数调用权限审计	通过
		call/delegatecall 安全审计	通过
		返回值安全审计	通过
		自毁函数安全审计	通过
3	业务安全审计	owner 权限审计	通过
		业务逻辑审计	通过
		业务实现审计	通过
4	整型溢出审计	-	通过
5	可重入攻击审计	-	通过
6	异常可达状态审计	-	通过
7	交易顺序依赖审计	-	通过
8	块参数依赖审计	-	通过
9	伪随机数生成审计	-	通过

10	拒绝服务攻击审计	-	通过
11	代币锁仓审计	-	通过
12	假充值审计	-	通过
13	event 安全审计	-	通过

备注：审计意见及建议请见代码注释。

审计结果说明：

本公司采用形式化验证、静态分析、动态分析、典型案例测试和人工审核的方式对智能合约GDA的代码规范性、安全性以及业务逻辑三个方面进行多维度全面的安全审计。**经审计，** GDA**合约通过所有检测，合约审计结果为通过(优)。**以下为本合约基本信息。

1、代币基本信息

Token name	GDA
Token symbol	GDA
decimals	18
totalSupply	2,100,000,000(总量恒定)
Token type	BEP-20

表1 GDA代币基本信息

2、代币锁仓信息

暂无锁仓

合约源代码审计注释：

Token.sol

```
// 0.5.1-c8a2
// Enable optimization
pragma solidity ^0.8.4; // 成都链安 // 建议固定编译器版本

import "./BEP20.sol";
import "./BEP20Detailed.sol" ;

/**
 * @title SimpleToken
 * @dev Very simple BEP20 Token example, where all tokens are pre-assigned to the
creator.
 * Note they can later distribute these tokens as they wish using `transfer` and other
 * `BEP20` functions.
 */
contract Token is BEP20, BEP20Detailed {
    /**
     * @dev Constructor that gives msg.sender all of existing tokens.
     */
    // 成都链安 // 初始化代币名称，标识，精度

    constructor () public BEP20Detailed("GDA", "GDA", 18) {
        _mint(msg.sender, 2100000000 * (10 ** uint256(decimals()))); // 成都链安 // 将
初始化 代币发送给合约创建者
    }
}
// 成都链安 // 建议主合约继承 Pausable 模块，当出现重大异常时owner 可以暂停所有交易
```

BEP20.sol

```
pragma solidity ^0.8.4;

import "./IBEP20.sol";
import "./SafeMath.sol";

/**
 * @dev Implementation of the {IBEP20} 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 {BEP20Mintable}.
 *
 * TIP: For a detailed writeup see our guide
 * https://forum.zeppelin.solutions/t/how-to-implement-BEP20-supply-mechanisms/226[How
 * to implement supply mechanisms].
 *
```

```
 * We have followed general OpenZeppelin guidelines: functions revert instead
 * of returning `false` on failure. This behavior is nonetheless conventional
 * and does not conflict with the expectations of BEP20 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 {IBEP20-approve}.
 */
contract BEP20 is IBEP20 {
    using SafeMath for uint256; // 成都链安 // 引用 SafeMath 安全库，用于安全数学运算

    mapping (address => uint256) private _balances; // 成都链安 // 声明 mapping 变量_balances，存储指定地址的代币余额

    mapping (address => mapping (address => uint256)) private _allowances; // 成都链安 // 声明 mapping 变量_allowances，存储对应地址间的授权值

    uint256 private _totalSupply; // 成都链安 // 声明变量_totalSupply，存储代币总量

    /**
     * @dev See {IBEP20-totalSupply}.
     */
    function totalSupply() public view returns (uint256) {
        return _totalSupply; // 成都链安 // 返回代币总量
    }

    /**
     * @dev See {IBEP20-balanceOf}.
     */
    function balanceOf(address account) public view returns (uint256) {
        return _balances[account]; // 成都链安 // 返回账户代币余额
    }

    /**
     * @dev See {IBEP20-transfer}.
     *
     * Requirements:
     *
     * - `recipient` cannot be the zero address.
     * - the caller must have a balance of at least `amount`.
     */
    function transfer(address recipient, uint256 amount) public returns (bool) {
        _transfer(msg.sender, recipient, amount); // 成都链安 // 调用内部函数_transfer
```

进行代币转账

```
        return true;
    }

    /**
     * @dev See {IBEP20-allowance}.
     */
    function allowance(address owner, address spender) public view returns (uint256) {
        return _allowances[owner][spender]; // 成都链安 // 返回指定地址 owner 对 spender 的授权值
    }

    /**
     * @dev See {IBEP20-approve}.
     *
     * Requirements:
     *
     * - `spender` cannot be the zero address.
     */
    // 成都链安 // 用户调用该函数修改授权值时，可能导致多重授权，建议用户使用 increaseAllowance 与 decreaseAllowance 修改授权值
    function approve(address spender, uint256 value) public returns (bool) {
        _approve(msg.sender, spender, value);
        return true;
    }

    /**
     * @dev See {IBEP20-transferFrom}.
     *
     * Emits an {Approval} event indicating the updated allowance. This is not
     * required by the EIP. See the note at the beginning of {BEP20};
     *
     * Requirements:
     * - `sender` and `recipient` cannot be the zero address.
     * - `sender` must have a balance of at least `value`.
     * - the caller must have allowance for `sender`'s tokens of at least
     * `amount`.
     */
    function transferFrom(address sender, address recipient, uint256 amount) public returns (bool) {
        _transfer(sender, recipient, amount); // 成都链安 // 调用内部函数_transfer 进行代币转账
        _approve(sender, msg.sender, _allowances[sender][msg.sender].sub(amount)); // 成都链安 // 调用内部函数_approve 更新代币发送者 sender 对调用者的授权值
        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 {IBEP20-approve}.
     *
     * Emits an {Approval} event indicating the updated allowance.
     *
     * Requirements:
     *
     * - `spender` cannot be the zero address.
     */
    function increaseAllowance(address spender, uint256 addedValue) public returns
(bool) {
        _approve(msg.sender, spender, _allowances[msg.sender][spender].add(addedValue));
// 成都链安 // 调用内部函数_approve 增加调用者对 spender 的授权值
        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 {IBEP20-approve}.
     *
     * Emits an {Approval} event indicating the updated allowance.
     *
     * Requirements:
     *
     * - `spender` cannot be the zero address.
     * - `spender` must have allowance for the caller of at least
     * `subtractedValue`.
     */
    function decreaseAllowance(address spender, uint256 subtractedValue) public returns
(bool) {
        _approve(msg.sender, spender,
_allowances[msg.sender][spender].sub(subtractedValue)); // 成都链安 // 调用内部函数
_approve 减少调用者对 spender 的授权值
        return true;
    }

    /**
     * @dev Moves tokens `amount` from `sender` to `recipient`.
     *
     * This is 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:
     *
     * - `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 {
        require(sender != address(0), "BEP20: transfer from the zero address"); // 成都链安 // sender 非零地址检查
        require(recipient != address(0), "BEP20: transfer to the zero address"); // 成都链安 // recipient 非零地址检查

        _balances[sender] = _balances[sender].sub(amount); // 成都链安 // 更新 sender 地址代币余额
        _balances[recipient] = _balances[recipient].add(amount); // 成都链安 // 更新 recipient 地址代币余额
        emit Transfer(sender, recipient, amount); // 成都链安 // 触发 Transfer 事件
    }

    /** @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
     *
     * - `to` cannot be the zero address.
     */
    function _mint(address account, uint256 amount) internal {
        require(account != address(0), "BEP20: mint to the zero address"); // 成都链安 // account 非零地址检查

        _totalSupply = _totalSupply.add(amount); // 成都链安 // 更新代币总量
        _balances[account] = _balances[account].add(amount); // 成都链安 // 更新 account 地址代币余额
        emit Transfer(address(0), account, amount); // 成都链安 // 触发 Transfer 事件
    }

     /**
     * @dev Destroys `amount` tokens from `account`, reducing the
     * total supply.
     *
     * Emits a {Transfer} event with `to` set to the zero address.
     *
     * Requirements
     *
     * - `account` cannot be the zero address.
```

```
     * - `account` must have at least `amount` tokens.
     */
    function _burn(address account, uint256 value) internal {
        require(account != address(0), "BEP20: burn from the zero address"); // 成都链安 // account 非零地址检查

        _totalSupply = _totalSupply.sub(value); // 成都链安 // 更新代币总量
        _balances[account] = _balances[account].sub(value); // 成都链安 // 更新 account 地址代币余额
        emit Transfer(account, address(0), value); // 成都链安 // 触发 Transfer 事件
    }

    /**
     * @dev Sets `amount` as the allowance of `spender` over the `owner`s tokens.
     *
     * This is 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 value) internal {
        require(owner != address(0), "BEP20: approve from the zero address"); // 成都链安 // owner 非零地址检查
        require(spender != address(0), "BEP20: approve to the zero address"); // 成都链安 // spender 非零地址检查

        _allowances[owner][spender] = value; // 成都链安 // 更新 owner 对 spender 的授权值
        emit Approval(owner, spender, value); // 成都链安 // 触发 Approval 事件
    }
    /**
     * @dev Destoys `amount` tokens from `account`.`amount` is then deducted
     * from the caller's allowance.
     *
     * See {_burn} and {_approve}.
     */
    function _burnFrom(address account, uint256 amount) internal {
        _burn(account, amount); // 成都链安 // 销毁账户代币
        _approve(account, msg.sender, _allowances[account][msg.sender].sub(amount)); // 成都链安 // 更新授权值
    }
}
```

BEP20Detailed sol

```
pragma solidity ^0.8.4;

import "./IBEP20.sol";

/**
 * @dev Optional functions from the BEP20 standard.
 */
contract BEP20Detailed is IBEP20 {
    string private _name; // 成都链安 // 声明变量_name，用于存储代币名称
    string private _symbol; // 成都链安 // 声明变量_symbol,用于存储代币标识
    uint8 private _decimals; // 成都链安 // 声明变量_decimals,用于存储代币精度

    /**
     * @dev Sets the values for `name`, `symbol`, and `decimals`. All three of
     * these values are immutable: they can only be set once during
     * construction.
     */
    constructor (string memory name, string memory symbol, uint8 decimals) public {
        _name = name; // 成都链安 // 初始化代币名称
        _symbol = symbol; // 成都链安 // 初始化代币标识
        _decimals = decimals; // 成都链安 // 初始化代币精度
    }

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

    /**
     * @dev Returns the symbol of the token, usually a shorter version of the
     * name.
     */
    function symbol() public view 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.
     *
     * NOTE: This information is only used for _display_ purposes: it in
     * no way affects any of the arithmetic of the contract, including
```

```
     * {IBEP20-balanceOf} and {IBEP20-transfer}.
     */
    function decimals() public view returns (uint8) {
        return _decimals;
    }
}
```

IBEP20.sol

```
pragma solidity ^0.8.4;

/**
 * @dev Interface of the BEP20 standard as defined in the EIP. Does not include
 * the optional functions; to access them see {BEP20Detailed}.
 */
// 成都链安 // 定义 BEP20 标准要求的接口函数与事件
interface IBEP20 {
    /**
     * @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 `recipient`.
     *
     * Returns a boolean value indicating whether the operation succeeded.
     *
     * Emits a {Transfer} event.
     */
    function transfer(address recipient, 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 `sender` to `recipient` 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 sender, address recipient, 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);
}
```

SafeMath.sol

```
pragma solidity ^0.8.4;

/**
 * @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.
 */
```

// 成都链安 // SafeMath 库用于安全数学运算以避免整型溢出

```
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 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) {
        require(b <= a, "SafeMath: subtraction overflow");
        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 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) {
        // Solidity only automatically asserts when dividing by 0
        require(b > 0, "SafeMath: division by zero");
        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) {
        require(b != 0, "SafeMath: modulo by zero");
        return a % b;
    }
}
```

成都链安
BEOSIN

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