(ENG) BiFi-X Smart Contract: Code Architecture
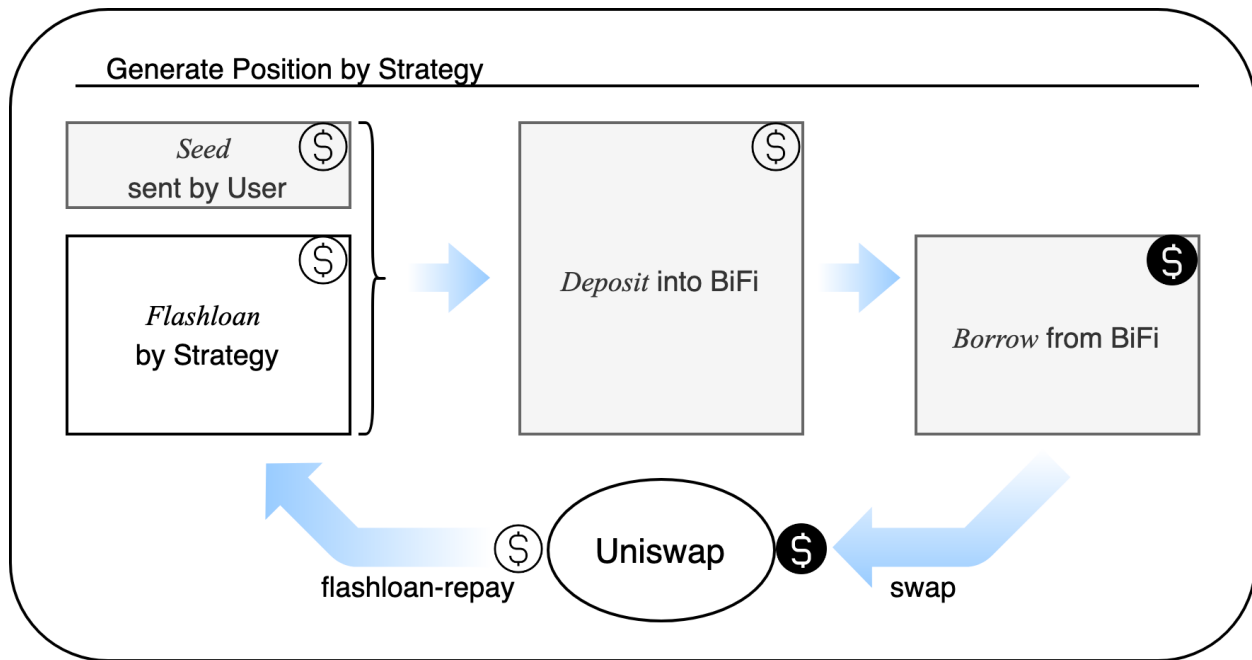
1. Introduction

BiFi-X is a blockchain service for users to manage the assets efficiently with the BiFi lending and BiFi flash loan. BiFi-X optimizes the following BiFi actions.
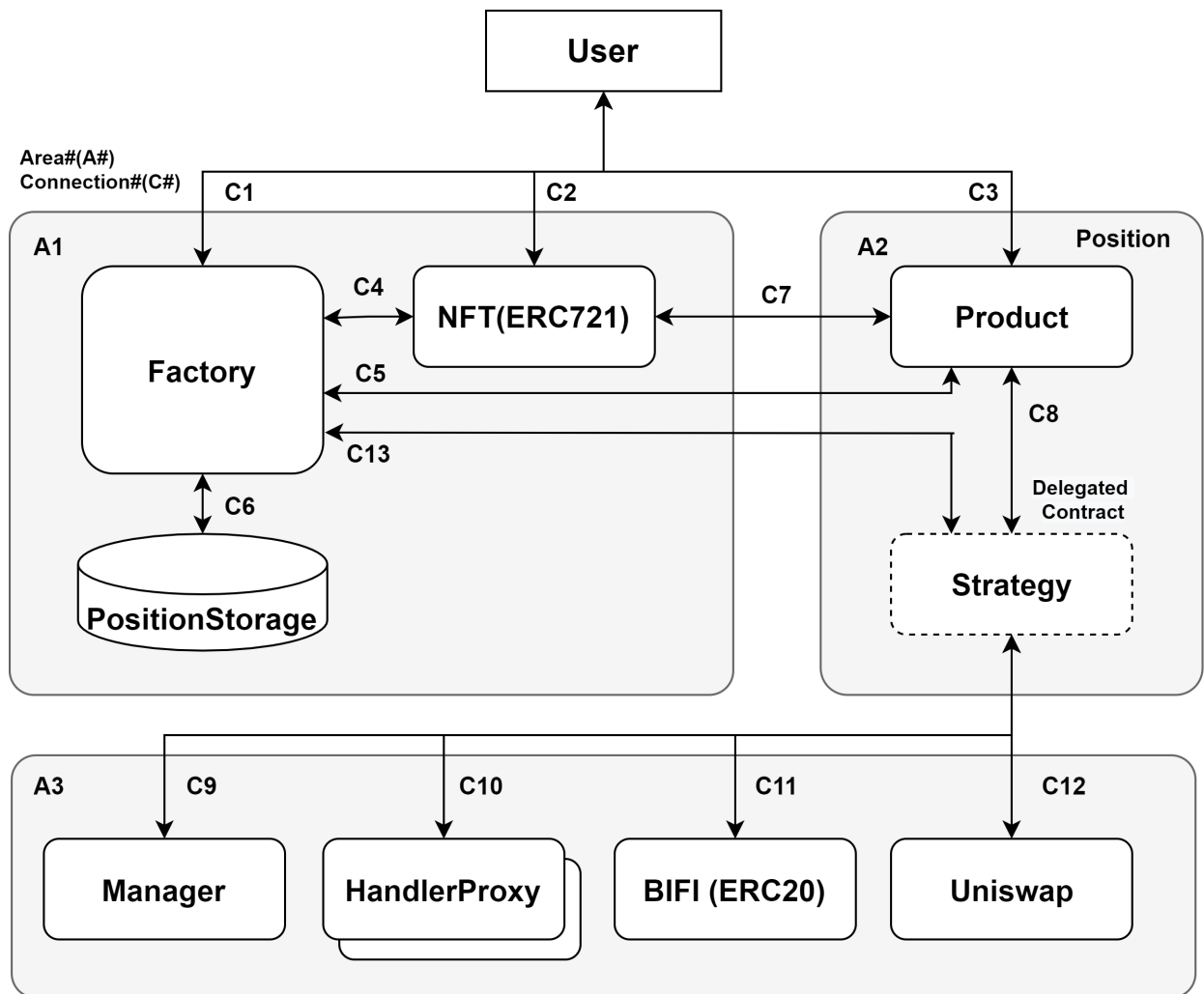
- **Yield Farming:** maximizes the profit from reward tokens (i.e., BiFi) by depositing and borrowing a crypto asset with the BiFi flash loan.

- **Long position:** expecting a long position, maximizes the crypto-asset deposit (by borrowing stable coins) at once via the BiFi flash loan.

- **Short position:** preparing the price drop of crypto assets, maximizes the crypto-asset loan (by depositing stable coins) via the BiFI flash loan.

Without flash loan, users have to pay high transaction fees to make these positions by multiple transactions for repeating deposit-borrow, repay-withdraw actions without the flash loan. BiFi-X makes the positions in a single transaction by using the BiFi flash loan.

The ownership of each position is represented by a unique NFT (Non-Fungible Token), and the NFT position can be traded in NFT market places. In near future, BiFi-X will add more strategies and help to make positions representing various financial products.

2. Architecture

2.1. Overview

A whole system consists of three contract groups.

- A1: contracts for creating and managing the positions
- A2: contracts for the functions of the positions
- A3: external contracts interacting the positions

A user calls the Factory contract (section 2.3.1) selecting a strategy and parameters to create a position. A position consists of the contracts of A2.

The Position Core contract (section 2.3.3) is the main contract of the position. It is connected to the Strategy Logic contract (section 2.3.5) and the Slot contract (section 2.3.4) that stores data.

The Strategy Logic contract carries out a strategy as interacting the external contracts of A3.

2.2. BiFi-X Core Contracts

2.2.1. Factory Contract

Creates a Position contract (Product Creation, Set Strategy) and stores the information of the created position to the PositionStorage contract.

2.2.2. PositionStorage Contract

Stores the position information, which was created by the Factory contract. The position information includes the followings:

- The address of the Strategy Contract contract for the position.
- The list of addresses of position contracts that belong to the user.
- The address of the Strategy Logic contract.
- The address of the Factory Contract contract.

2.2.3. Position(A2)

A position consists of a Product contract and a Strategy Logic contract. Thus, creating a position is the process of deploying a Position contract and mapping it to a Strategy Logic contract.

- **Position = Product contract + Strategy contract**

2.2.4. Product contract

A Product contract is an entry point of actions and implemented as a proxy connected to a Strategy Logic contract.

2.2.5. Slot contract

A Slot contract is used as a base contract to let Product contracts have the same storage slot structure by inheriting from the Slot contract. The same storage slot structure is required for delegate calls to/from the Strategy Logic contracts.

- The address of the Strategy Logic contract

- The amount of invested assets.

- The address of the NFT(ERC721) contract

2.2.6. Strategy Logic contract

A Strategy Logic contracts implements a trading strategy using BiFi-flashloan, BiFi-Lending, and Uniswap. Currently, BiFi-X supports the following strategies.

- LongShortLogic: for long and short position.

- EarnLogic: for yield farming.

3. Create a position

3.1. Create a Product contract (A1)

A user request the creation of a Product contract to the Factory contract.

- `C1` : A user sends seed tokens (i.e., initial investment) and position parameters for creating a position.

- `C5` : The Factory contract creates a Product contract and assigns the selected Strategy Logic contract. It also delivers the seed tokens to the created Product contract.

3.2. Execute the Strategy Logic (A2, A3)

- `C8` : The Product contract calls the Strategy Logic contract.

3.2.1. EarnLogic

The EarnLogic strategy set a yield-optimized position maximized by depositing and borrowing tokens of a single type.

- `C9` : Calls the flash loan of the BiFi Manager contract.
- `C10` : Calls the Deposit and Borrow actions of BiFi and then repay the flash loan.

3.2.2. LongShortLogic

The LongShortLogic strategy supports a long or short position by using stable coins and crypto assets.

- `C9` : Calls the flash loan of the BiFi Manager contract.
- `C10` : Calls the Deposit and Borrow actions of BiFi.
- `C12` : Swaps all the borrowed assets to the deposited assets and then repay the flash loan.

3.3. Finish the Strategy (A2)

The Product contract stores the information after finishing the strategy.

- `C8` : The Product contract stores the information from the Strategy Logic contracts.
- `C4` : The Factory contract creates a NFT token for the position.
- `C6` : The Factory contracts stores the addresses of the Product contract and the owner to the PositionStorage contract.

4. Close a position

A position is closed via BiFI Repay and Withdraw actions.

4.1. Execute the Strategy (A2, A3)

The Product contract executes the Strategy Logic contract to close its position.

- `C3` : A user request the position closure to the Product contract.
- `C8` : A Product contract calls the Strategy logic contract.

4.1.1. EarnLogic

Close a yield-farming position.

- `C9` : The Product contract calls the flash loan of the BiFi Manager.

- `C10` : Calls the Withdraw and Repay actions of BiFi and then repay the flash loan.

4.1.2. **LongShortLogic**

Close a long or short position.

- `C9` : The Product contract calls the flash loan of the BiFi Manager.

- `C10` : Calls the Repay and Withdraw actions of BiFi.

- `C12` : Swaps all the withdrawn assets to the borrowed assets and then repay the flash loan.

4.2. Finish the Strategy (A2)

The Product contract clean up contracts after finishing the Strategy(close).

- `C11` : The Product contract sends the reward BiFi tokens to the owner and executes the `self-destruct` instruction.