



**ANASTASIA LABS**

## **HOW TO USE**

Aiken Multisig Offchain

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## Contents

<b>1. Introduction .....</b>	<b>1</b>
<b>2. Prerequisites .....</b>	<b>2</b>
<b>3. Smart Contract Overview .....</b>	<b>3</b>
<b>4. Merchant Operations .....</b>	<b>4</b>
4.1. Create a Service .....	4
4.2. Withdraw Fees .....	5
<b>5. Subscriber Operations .....</b>	<b>7</b>
5.1. Create User Account .....	7
5.2. Initiate Subscription .....	8
5.3. Unsubscribe .....	8

# How to Use the Aiken Multisig Offchain via Maestro

## 1. Introduction

The Aiken Multisig Offchain is designed to manage recurring payments on the Cardano blockchain. It automates subscriber-to-merchant interactions such as service creation, account registration, subscription initiation, extension, cancellation, and fund withdrawals. This guide assists developers in integrating these functions into their applications via Maestro's API endpoints.

### **Key features include:**

- Initiating subscriptions with customizable terms
- Extending or terminating subscriptions
- Automated recurring payments
- Secure withdrawal of funds for both merchants and subscribers
- Seamless integration via RESTful API endpoints

## 2. Prerequisites

Before you begin, ensure that you have:

- **Access Credentials:**
  - Maestro API Key (Get from [Maestro Getting Started](#))
  - Cardano wallet address with sufficient funds
- **Environment Setup:** Basic familiarity with REST APIs and JSON data formats.

### 3. Smart Contract Overview

The Aiken Multisig Offchain comprises three main components:

1. **Service Contract:**

- Initiates services by minting service NFTs.
- Manages updates and deactivation of services.

2. **Account Contract:**

- Registers a subscriber account by minting a CIP-68 compliant Account NFT.
- Facilitates metadata updates or account removal.

3. **Payment Contract:** Handles the core functionality, including:

- Prepaid subscription fee management.
- Subscription renewal, extension, or cancellation.
- Gradual fund release with linear vesting.

Each function is accompanied by detailed onchain and offchain documentation. This guide focuses on how each API endpoint maps to these smart contract functionalities.

## 4. Merchant Operations

### 4.1. Create a Service

Merchants use this to define subscription terms and effectively create a new Service.

- Uses the Service Validator to mint a Service NFT and its corresponding reference NFT.
- Validates the service fee, penalty fee, interval length, and activation status.

#### Endpoint:

**POST** <https://mainnet.gomaestro-api.org/v1/contracts/subscription/createService>

#### Required Parameters:

- **merchant\_address**: Address of the merchant.
- **selected\_out\_ref**: Object containing tx\_hash and output\_index used to derive token names.
- **service\_fee\_policyid, service\_fee\_assetname, service\_fee**: Define the fee for the service.
- **penalty\_fee\_policyid, penalty\_fee\_assetname, penalty\_fee**: Define the penalty fee.
- **interval\_length**: Subscription interval duration (in milliseconds).
- **num\_intervals**: Total number of intervals.
- **is\_active**: Boolean flag indicating the service's active state.

### cURL Example:

```
# subscription: create service
curl --location 'https://mainnet.gomaestro-api.org/v1/contracts/subscription/
createService' \
--header 'Content-Type: application/json' \
--header 'api-key: ${API_KEY}' \
--data '{
  "merchant_address":
"addr1qxccwptmx6r523vxcrplvfhtprdut8s0hht0fyt9f8vy8385chtg2dupkyqu7pgqawju7awrwfg94skstmaves6hwaks6qlg
  "selected_out_ref": {
    "tx_hash": "f68f85ee40866144f52d8087414cfb11ec22539b3772882440bf0adfea105513",
    "output_index": 1
  },
  "service_fee_policyid": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec",
  "service_fee_assetname": "54616c6f73",
  "service_fee": 1000,
  "penalty_fee_policyid": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec",
  "penalty_fee_assetname": "54616c6f73",
  "penalty_fee": 10,
  "interval_length": 2592000000,
  "num_intervals": 1,
  "is_active": true
}'
```

## 4.2. Withdraw Fees

Allows the merchant to withdraw the accumulated subscription fees. Uses the Payment Validator's *MerchantWithdraw* redeemer and enforces linear vesting rules as specified.

### Endpoint:

**POST** <https://mainnet.gomaestro-api.org/v1/contracts/subscription/withdrawFees>

### Required Parameters:

- **merchant\_address**: Address of the merchant.
- **service\_nft\_tn**: The token name for the Service NFT.
- **subscriber\_nft\_tn**: The token name for the Subscriber NFT.

- **merchant\_nft\_tn**: The token name proving merchant ownership.
- **payment\_nft\_tn**: The Payment NFT token involved.
- **current\_time**: Current Unix timestamp to validate withdrawal timing.

### cURL Example:

```
# subscription: merchant withdrawal
curl --location 'https://mainnet.gomaestro-api.org/v1/contracts/subscription/withdrawFees' \
  --header 'Content-Type: application/json' \
  --header 'api-key ${API_KEY}' \
  --data '{
    "merchant_address":
"addr1qxcccwptmx6r523vxcrplvfhtpdt8s0hht0fyt9f8vy8385chtg2dupkyqu7pgqawju7awrwfg94skstmaves6hwaks6qlg
    "service_nft_tn": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec54616c",
    "subscriber_nft_tn": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec54616c",
    "merchant_nft_tn": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec54616c",
    "payment_nft_tn": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec54616c",
    "current_time": 1696320000
  }'
```



## 5. Subscriber Operations

### 5.1. Create User Account

Subscribers create an account to manage subscriptions.

- Uses the Account Validator to mint an Account NFT and its reference NFT.
- Registers a subscriber's account with either an email hash or a phone hash.

#### Endpoint:

**POST** <https://mainnet.gomaestro-api.org/v1/contracts/subscription/createUserAccount>

#### Required Parameters:

- **subscriber\_address**: Address of the subscriber.
- **selected\_out\_ref**: UTxO with **tx\_hash** and **output\_index**.
- **email** and **phone**: Credentials as a string.

#### cURL Example:

```
# subscription: create user account
curl --location 'https://mainnet.gomaestro-api.org/v1/contracts/subscription/
createUserAccount' \
--header 'Content-Type: application/json' \
--header 'api-key ${API_KEY}' \
--data '{
  "subscriber_address":
"addr1qxccwptmx6r523vxcrplvfhtpdt8s0hht0fyf9f8vy8385chtg2dupkyqu7pgqawju7awrwfg94skstmaves6hwaks6qlg
  "selected_out_ref": {
    "tx_hash": "f68f85ee40866144f52d8087414cfb11ec22539b3772882440bf0adfea105513",
    "output_index": 1
  },
  "email": "",
  "phone": ""
}'
```

## 5.2. Initiate Subscription

Locks funds by minting a Payment NFT and setting up a Payment datum that includes the subscription start time, service reference token, and subscriber reference token. This action creates a unique Payment Token that signifies the start of a subscription.

### Endpoint:

**POST** <https://mainnet.gomaestro-api.org/v1/contracts/subscription/initSubscription>

### Required Parameters:

- **service\_nft\_tn**: Combined token string for the service NFT.
- **subscriber\_nft\_tn**: Combined token string for the subscriber NFT.
- **subscription\_start**: Unix timestamp marking the start of the subscription.

### cURL Example:

```
# subscription: initiate subscription
curl --location 'https://mainnet.gomaestro-api.org/v1/contracts/subscription/
initSubscription' \
--header 'Content-Type: application/json' \
--header 'api-key ${API_KEY}' \
--data '{
    "service_nft_tn": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec54616c",
    "subscriber_nft_tn": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec54616c",
    "subscription_start": 1696320000
}'
```

## 5.3. Unsubscribe

Allows a subscriber to cancel their active subscription.

### Endpoint:

**POST** <https://mainnet.gomaestro-api.org/v1/contracts/subscription/unsubscribe>

### Required Parameters:

- **subscriber\_address**: Address of the subscriber initiating the unsubscription.
- **service\_nft\_tn**: The token string for the Service NFT.
- **subscriber\_nft\_tn**: The token string for the Subscriber NFT.
- **current\_time**: Unix timestamp used for validating penalty application.

### cURL Example:

```
# subscription: unsubscribe
curl --location 'https://mainnet.gomaestro-api.org/v1/contracts/subscription/unsubscribe' \
--header 'Content-Type: application/json' \
--header 'api-key ${API_KEY}' \
--data '{
  "subscriber_address":
"addr1qxccwptmx6r523vxcrplvfhtpdt8s0hht0fyf9f8vy8385chtg2dupkyqu7pgqawju7awrwfg94skstmaves6hwaks6q1g
  "service_nft_tn": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec54616c",
  "subscriber_nft_tn": "97bbb7db0baef89caefce61b8107ac74c7a7340166b39d906f174bec54616c",
  "current_time": 1696320000
}'
```

**Note:** Early termination may incur penalties if defined in the service contract.