

asset, e.g., a payment, to either acknowledge the receipt of the transfer prior to a deadline by generating cryptographic proof of the transfer, or forfeit the ability to claim the asset transferred, thereby returning the asset to the transferring party. HTLCs may be utilized to implement atomic swap protocols. However, current implementations of HTLC-based atomic swap protocols require substantial amount of setup time.

## SUMMARY

[0008] In one aspect, a computer-implemented method for executing an anonymous multi-swap (AMS) contract between a first user and a second user includes: detecting a recordation of a first plurality of parameters for the AMS contract on a first blockchain, the first plurality of parameters including: an initial value of a first function lock on the first blockchain, at least one action to be performed on the first blockchain when the AMS contract is executed, and a maximum number of times the AMS contract can be executed, the maximum number of times the AMS contract can be executed being greater than one; recording a second plurality of parameters for the AMS contract on a second blockchain, the second plurality of parameters including: an initial value of a second function lock on the second blockchain, at least one action to be performed on the second blockchain when the AMS contract is executed, and the maximum number of times the AMS contract can be executed, the initial value of the second function lock being different from the initial value of the first function lock; detecting an invocation of a request to execute the AMS contract on the second blockchain; retrieving, from the request to execute the AMS contract on the second blockchain, a retrieved key used to unlock the second function lock on the second blockchain; calculating, based on the retrieved key, a calculated key for unlocking the first function lock on the first

## **What Is Claimed Is:**

1. A computer-implemented method for executing an anonymous multi-swap (AMS) contract between a first user and a second user, the method comprising:

detecting a recordation of a first plurality of parameters for the AMS contract on a first blockchain, the first plurality of parameters including: an initial value of a first function lock on the first blockchain, at least one action to be performed on the first blockchain when the AMS contract is executed, and a maximum number of times the AMS contract can be executed, the maximum number of times the AMS contract can be executed being greater than one;

recording a second plurality of parameters for the AMS contract on a second blockchain, the second plurality of parameters including: an initial value of a second function lock on the second blockchain, at least one action to be performed on the second blockchain when the AMS contract is executed, and the maximum number of times the AMS contract can be executed, the initial value of the second function lock being different from the initial value of the first function lock;

detecting an invocation of a request to execute the AMS contract on the second blockchain;

retrieving, from the request to execute the AMS contract on the second blockchain, a retrieved key used to unlock the second function lock on the second blockchain;

calculating, based on the retrieved key, a calculated key for unlocking the first function lock on the first blockchain; and

invoking a request to execute the AMS contract on the first blockchain with the calculated key.

2. A computer-implemented method for executing an anonymous multi-swap (AMS) contract between a first user and a second user, the method comprising:

recording, by the first user, a first plurality of parameters for the AMS contract on a first blockchain, the first plurality of parameters including: an initial value of a first function lock on the first blockchain, at least one action to be performed on the first blockchain when the AMS contract is executed, and a maximum number of times the AMS contract can be executed, the maximum number of times the AMS contract can be executed being greater than one;

recording, by the second user, a second plurality of parameters for the AMS contract on a second blockchain, the second plurality of parameters including: an initial value of a second function lock on the second blockchain, at least one action to be performed on the second blockchain when the AMS contract is executed, and the maximum number of times the AMS contract can be executed, the initial value of the second function lock being different from the initial value of the first function lock;

invoking, by the first user, of a request to execute the AMS contract on the second blockchain;

retrieving, by the second user, a key used by the first user to unlock the second function lock on the second blockchain;

calculating, by the second user, a key to be used by the second user to unlock the first function lock on the first blockchain; and

invoking, by the second user, a request to execute the AMS contract on the first blockchain with the calculated key.

3. The method of any preceding claim, wherein the at least one action to be performed on the first blockchain comprises at least one action to transfer a first asset recorded on the first blockchain from the first user to the second user, and the