BLOCKCHAIN INTEROPERABILITY

Technical Field

[001] This application claims priority to U.S. Provisional Patent Application Serial No. 62/622,371, filed 26 January 2018, Attorney Docket No. 15718/352, and titled Blockchain Interoperability, which is incorporated by reference in its entirety. This application also claims priority to U.S. Provisional Patent Application Serial No. 62/769,343, filed 19 November 2018, Attorney Docket No. 15718/500, and titled Blockchain Interoperability, which is incorporated by reference in its entirety

Technical Field

[002] This disclosure relates to interoperability among distributed ledger technologies.

Background

[003] Rapid advances in electronics and communication technologies, driven by immense customer demand, have resulted in newly emerging complex network transaction chains. Improvements in the hardware and software implementations of the underlying processing for the transaction chains will increase the security, reliability, and speed of the implementations.

Summary of Invention

[003a] According to a first aspect of the present invention, there is provided a system including: an origin memory storing an origin blockchain, the origin blockchain compliant with an origin distributed ledger technology; a target memory storing a target blockchain, the target blockchain compliant with a target distributed ledger technology; and interop circuitry configured to: implement a multiple-tier exchange by: within an establishment tier of the multiple-tier exchange: receiving an origin write

permission for the origin blockchain; and receiving a target write permission for the target blockchain within a transfer tier of the multiple-tier exchange, the transfer tier configured to execute after the establishment tier: receiving from origin participant circuitry associated with the origin blockchain an origin asset permission, the origin asset permission to allow transfer of an asset tracked on the origin blockchain to the target blockchain; sending a request to target participant circuitry associated with the target blockchain to instantiate the asset on the target blockchain; and responsive to the request, receiving a target asset permission to instantiate the asset on the target blockchain, the target asset permission configured to allow instantiation of the asset on the target blockchain; and operate as an interoperability node between the origin and target blockchains by: using the origin asset permission, locking the asset on the origin blockchain; and using the target asset permission, instantiating the asset on the target blockchain

[003b] According to a second aspect of the present invention, there is provided a method including: at interop circuitry: implementing a multiple-tier exchange by: within an establishment tier of the multiple-tier exchange: receiving an origin write permission for an origin blockchain; and receiving a target write permission for a target blockchain within a transfer tier of the multiple-tier exchange, the transfer tier executing after the establishment tier: receiving from origin participant circuitry associated with the origin blockchain an origin asset permission to transfer an asset tracked on the origin blockchain to the target blockchain, the origin blockchain stored on an origin memory and compliant with an origin distributed ledger technology; sending a request to target participant circuitry associated with the target blockchain to instantiate the asset on the target blockchain, the target blockchain stored on a target memory and compliant with a target distributed ledger technology; and responsive to the request, receiving a target asset permission to instantiate the asset on the target blockchain; and operating as an interoperability node between the origin and target blockchains by: using the origin asset permission, locking the asset on the origin blockchain; and using the target asset permission, instantiating the asset on the target blockchain.

[003c] According to a third aspect of the present invention, there is provided a product including: machine-readable media other than a transitory signal; and instructions stored on the machine-readable media, the instructions configured to,

when executed, cause a machine to: at interop circuitry: implement a multiple-tier exchange by: within an establishment tier of the multiple-tier exchange: receiving an origin write permission for an origin blockchain; and receiving a target write permission for a target blockchain within a transfer tier of the multiple-tier exchange, the transfer tier configured to execute after the establishment tier: receiving from origin participant circuitry associated with the origin blockchain an origin asset permission to transfer an asset tracked on the origin blockchain to the target blockchain, the origin blockchain stored on an origin memory and compliant with an origin distributed ledger technology; sending a request to target participant circuitry associated with the target blockchain to instantiate the asset on the target blockchain, the target blockchain stored on a target memory and compliant with a target distributed ledger technology; and responsive to the request, receiving a target asset permission to instantiate the asset on the target blockchain; and operate as an interoperability node between the origin and target blockchains by: using the origin asset permission, locking the asset on the origin blockchain; and using the target asset permission, instantiating the asset on the target blockchain.

Brief Description of the Drawings

[004] Figure 1 shows a blockchain interop system interacting with participant circuitry.

[005] Figure 2 shows example interop logic.

Claims

What is claimed is:

1. A system including:

an origin memory storing an origin blockchain,

the origin blockchain compliant with an origin distributed ledger technology;

a target memory storing a target blockchain,

the target blockchain compliant with a target distributed ledger technology; and

interop circuitry configured to:

implement a multiple-tier exchange by:

within an establishment tier of the multiple-tier exchange:

receiving an origin write permission for the origin blockchain; and

receiving a target write permission for the target blockchain

within a transfer tier of the multiple-tier exchange, the transfer tier configured to execute after the establishment tier:

receiving from origin participant circuitry associated with the origin blockchain an origin asset permission,

the origin asset permission to allow transfer of an asset tracked on the origin blockchain to the target blockchain;

sending a request to target participant circuitry associated with the target blockchain to instantiate the asset on the target blockchain; and

responsive to the request, receiving a target asset permission to instantiate the asset on the target blockchain, the target asset permission configured to allow instantiation of the asset on the target blockchain; and

operate as an interoperability node between the origin and target blockchains by:

using the origin asset permission, locking the asset on the origin blockchain; and

using the target asset permission, instantiating the asset on the target blockchain.

2. The system of claim 1, where the interop circuitry is further configured to obtain an origin security credential,

the origin security credential configured to establish an identity of the interop circuitry on the origin blockchain when using the origin write permission, the origin asset permission, or both.

3. The system of claim 1, where the interop circuitry is further configured to obtain target security credentials to establish an identity of the interop circuitry on the target blockchain when using the target write permission, the target asset permission, or both.

4. The system of claim 1, where the interop circuitry is configured to receive the origin and target asset permissions to facilitate an asset permission exchange ahead of transfer of the asset from the origin blockchain to the target blockchain.

5. The system of claim 4, where the origin and target asset permissions are configured to identify a participating node designated to receive a notice regarding transfer of the asset.

6. The system of claim 1, where the target asset permission identifies the asset and the origin distributed ledger technology.

7. The system of claim 1, where the interop circuitry is configured to lock the asset on the origin blockchain by:

generating by appending a string to the asset; and

hashing the combination of the asset and the string.

8. The system of claim 7, where the string is configured to indicate a lock state of the asset on the origin blockchain.

9. The system of claim 1, where the interop circuitry is configured to instantiate the asset on the target blockchain by:

generating by appending a string to the asset; and

hashing the combination of the asset and the string.

10. The system of claim 9, where the string is configured to indicate that the asset was transferred from the origin blockchain.

11. The system of claim 9, where content of the string is detailed within the target asset permission.

12. A method including:

at interop circuitry:

implementing a multiple-tier exchange by:

within an establishment tier of the multiple-tier exchange:

receiving an origin write permission for an origin blockchain; and

receiving a target write permission for a target blockchain

within a transfer tier of the multiple-tier exchange, the transfer tier executing after the establishment tier:

receiving from origin participant circuitry associated with the origin blockchain an origin asset permission to transfer an asset tracked on the origin blockchain to the target blockchain, the origin blockchain stored on an origin memory and compliant with an origin distributed ledger technology;

sending a request to target participant circuitry associated with the target blockchain to instantiate the asset on the target blockchain, the target blockchain stored on a target memory and compliant with a target distributed ledger technology; and

responsive to the request, receiving a target asset permission to instantiate the asset on the target blockchain; and

operating as an interoperability node between the origin and target blockchains by:

using the origin asset permission, locking the asset on the origin blockchain; and

using the target asset permission, instantiating the asset on the target blockchain.

13. The method of claim 12, where receiving the origin and target asset permissions comprises facilitating an asset permission exchange ahead of transfer of the asset from the origin blockchain to the target blockchain.

14. The method of claim 13, where the origin and target asset permissions identify a participating node designated to receive a notice regarding transfer of the asset.

15. The method of claim 12, where the target asset permission identifies the asset and the origin distributed ledger technology.

16. The method of claim 12, where locking the asset on the origin blockchain comprises:

generating by appending a string to the asset; and

hashing the combination of the asset and the string.

17. A product including:

machine-readable media other than a transitory signal; and

instructions stored on the machine-readable media, the instructions configured to, when executed, cause a machine to:

at interop circuitry:

implement a multiple-tier exchange by:

within an establishment tier of the multiple-tier exchange:

receiving an origin write permission for an origin blockchain; and

receiving a target write permission for a target blockchain

within a transfer tier of the multiple-tier exchange, the transfer tier configured to execute after the establishment tier:

receiving from origin participant circuitry associated with the origin blockchain an origin asset permission to transfer an asset tracked on the origin blockchain to the target blockchain, the origin blockchain stored on an origin memory and compliant with an origin distributed ledger technology;

sending a request to target participant circuitry associated with the target blockchain to instantiate the asset on the target blockchain, the target

blockchain stored on a target memory and compliant with a target distributed ledger technology; and

responsive to the request, receiving a target asset permission to instantiate the asset on the target blockchain; and

operate as an interoperability node between the origin and target blockchains by:

using the origin asset permission, locking the asset on the origin blockchain; and

using the target asset permission, instantiating the asset on the target blockchain.

18. The product of claim 17, where the instructions are configured to cause the machine to lock the asset on the origin blockchain by:

generating by appending a string to the asset; and

hashing the combination of the asset and the string.

19. The product of claim 18, where the string is configured to indicate a lock state of the asset on the origin blockchain.

20. The product of claim 18, where content of the string is detailed within the target asset permission.