

## WHAT IS CLAIMED IS:

### 1. A computer-implemented method comprising:

obtaining, by a computing system, a unified blockchain domain name (UBCDN) message of a blockchain instance in a unified blockchain network, wherein the unified blockchain network comprises a plurality of blockchain instances that are communicatively linked by two or more relays, and each of the plurality of blockchain instances comprises an implementation of a blockchain based on a respective blockchain platform or technology, wherein the UBCDN message comprises:

a UBCDN of the blockchain instance, wherein the UBCDN of the blockchain instance is recognizable globally by the plurality of blockchain instances in the unified blockchain network, and the UBCDN of the blockchain instance comprises:

a blockchain domain name of the blockchain instance, wherein the blockchain domain name is a unique identifier of the blockchain instance in the unified blockchain network, and wherein the blockchain domain name comprises a human-readable label, and

a chain identifier of the blockchain instance uniquely corresponding to the blockchain domain name, wherein the chain identifier of the blockchain instance indicates a blockchain network configuration of the blockchain instance and allows access to the blockchain instance based on the blockchain network configuration;

a digital signature of an owner of the UBCDN of the blockchain instance (a UBCDN owner) on the UBCDN; and

a domain certificate of the UBCDN;

verifying whether the domain certificate of the UBCDN is issued by a trusted certificate authority (CA) using a public key of the CA; and

verifying whether the UBCDN is issued by the UBCDN owner using a public key of the UBCDN owner.

### 2. The method of claim 1, wherein the computing system serves as a third party of the unified blockchain network.

3. The method of claim 1, wherein the computing system serves as a client node of a second blockchain instance different from the blockchain instance in the unified blockchain network, and the method further comprises:

in response to verifying that the UBCDN is issued by the UBCDN owner; and verifying that the domain certificate of the UBCDN is issued by a trusted CA, performing cross-chain transactions between the blockchain instance and the second blockchain instance based on the blockchain domain name of the blockchain instance.

4. The method of claim 1, wherein the domain certificate of the UBCDN comprises:

the blockchain domain name of the blockchain instance;  
the public key of the UBCDN owner; and  
a digital signature of the CA on the blockchain domain name of the blockchain instance and the public key of the UBCDN owner.

5. The method of claim 4, wherein the digital signature of the CA is obtained by the CA signing on the blockchain domain name of the blockchain instance and the public key of the UBCDN owner using a private key of the CA corresponding to the public key of the CA; and

wherein verifying whether the domain certificate of the UBCDN is issued by a trusted CA using a public key of the CA comprises verifying that the domain certificate of the UBCDN is issued by the CA using the domain certificate, the digital signature of the CA, and the public key of the CA.

6. The method of claim 4, wherein the digital signature of the owner of the UBCDN is obtained by the owner of the UBCDN signing the UBCDN using a private key corresponding to the public key of the owner of the UBCDN; and

wherein verifying whether the UBCDN of the blockchain instance is issued by the UBCDN owner using a public key of the owner of the UBCDN comprises verifying that the UBCDN is issued by the owner of the UBCDN using the UBCDN, the digital signature of the owner of the UBCDN, and the public key of the owner of the UBCDN.

7. A computer-implemented method of an owner of a unified blockchain domain name (UBCDN) of a blockchain instance comprising:

obtaining, by an owner of a UBCDN of a blockchain instance (a UBCDN owner) from a trusted certificate authority (CA), a domain certificate of the UBCDN of the blockchain instance, wherein a UBCDN of the blockchain instance comprises:

a blockchain domain name of the blockchain instance, wherein the blockchain domain name is a unique identifier of the blockchain instance in a unified blockchain network comprising a plurality of blockchain instances that are communicatively linked by two or more relays, and wherein the blockchain domain name comprises a human-readable label, and

a chain identifier of the blockchain instance uniquely corresponding to the blockchain domain name, wherein the chain identifier indicates a blockchain network configuration of the blockchain instance;

wherein the domain certificate of the UBCDN comprises:

the blockchain domain name of the blockchain instance;

a public key of the UBCDN owner; and

a digital signature of the CA on the blockchain domain name of the blockchain instance and the public key of the UBCDN owner;

signing, by the UBCDN owner, the UBCDN of the blockchain instance; and

publishing, by the UBCDN owner, a UBCDN message of the blockchain instance, wherein the UBCDN message comprises:

the UBCDN of the blockchain instance;

a digital signature of the UBCDN owner resulting from the signing the UBCDN; and

the domain certificate of the UBCDN.

8. The method of claim 7, further comprising:

identifying an updated chain identifier of the blockchain instance indicating an updated blockchain network configuration of the blockchain instance;

signing, by the UBCDN owner, an updated UBCDN of the blockchain instance that comprises the blockchain domain name of the blockchain instance and the updated chain identifier of the blockchain instance; and

publishing, by the UBCDN owner, an updated UBCDN message of the blockchain instance, wherein the updated UBCDN message comprises:

the updated UBCDN of the blockchain instance;

an updated digital signature of the UBCDN owner resulting from the signing the updated UBCDN; and

the domain certificate of the UBCDN.

9. A non-transitory computer-readable storage medium coupled to one or more processors and having instructions stored thereon which, when executed by the one or more processors, cause the one or more processors to perform operations in accordance with the method of one or more of claims 1-6.

10. A system, including:

a computing device; and

a computer-readable storage device coupled to the computing device and having instructions stored thereon which, when executed by the computing device, cause the computing device to perform operations in accordance with the method of one or more of claims 1-6.

11. A non-transitory computer-readable storage medium coupled to one or more processors and having instructions stored thereon which, when executed by the one or more processors, cause the one or more processors to perform operations in accordance with the method of one or more of claims 7-8.

12. A system, including:

a computing device; and

a computer-readable storage device coupled to the computing device and having instructions stored thereon which, when executed by the computing device, cause the computing device to perform operations in accordance with the method of one or more of claims 7-8.