SYSTEMS AND METHODS FOR PROVIDING IDENTITY SCORES

CROSS REFERENCE TO RELATED APPLICATIONS

[01] This application claims priority to U.S. Provisional Patent Application No. 62/345,968, filed on June 6, 2016, and U.S. Patent Application No. 15/432,407, filed on February 14, 2017, each of which is hereby incorporated by reference in its entirety.

BACKGROUND INFORMATION

[02] Currently a myriad of identities and identity systems exist to perform identifications within a variety of different contexts. Traditional paper or physical identities include state issued licenses, passports, etc., which authorities visually inspect, e.g., at government offices, traffic stops, and border crossings, to provide services, authorizations, etc. Commercial identities include bank cards, credit cards, membership cards, etc., which point of sale machines magnetically scan to enable transactions. Digital identities include accounts, user names and passwords for Facebook, Twitter, etc., which a server requests to enable access to content of the accounts. Biometric identities include fingerprints, facial characteristics, iris patterns, DNA sequences, etc., which are optically scanned, chemically tested, etc. to enable access to systems and services.

[03] However, the fractured nature of existing identities and identity systems has created problems for the use of identity in some contexts. The large number of identities and identity systems creates inefficiency in their implementation and use, as both identity users and entities performing identifications must have or support a variety of such identities and systems. Each of these identities is also typically targeted for only a relatively narrow purpose, and may not provide much usefulness beyond performing a basic identification of an individual. Finally, many of these identities and identity systems, whether traditional or of a more recent digital nature, are still susceptible to forgery, attack, or other fraudulent use, even in view of protective measures.

[04] Thus, a need exits for systems and methods to provide identity in a variety of different contexts, with a greater functionality, security and reliability.

SUMMARY

[04a] According to a first aspect of the invention, there is provided a method of providing an identity score to verify an identity, the method comprising: receiving, by an identity

system at an interface to a user system, identity data from the user system, the identity data related to identity plurality of identities of an identity user; receiving, by the identity system at one or more interfaces to one or more identity provider systems, validation data from the one or more identity provider systems, the validation data related to the identity data; upon the validation data indicating that the identity data is valid, generating one or more transactions to store data related to each of the plurality of identities of the identity user on a blockchain of a blockchain system, the data to be stored including for each of the plurality of identities a representation of at least one of: the identity data, or the validation data; transmitting the one or more transactions to at least one distributed node of the blockchain systemexecuting a read to the blockchain system to retrieve the data related to the plurality of identities; determining the identity score as a combination of, for each of the plurality of identities, a respective quantity based on the retrieved data; and providing, by the identity system at an interface to a score requestor system, the identity score to the score requestor system.

[04b] According to a second aspect of the invention, there is provided a method of providing an identity score to verify an identity, the method comprising: for each of a plurality of identities of an identity user, storing data related to validated identity data of the respective identity in a blockchain of a blockchain system; receiving, by an identity system at an interface with a score requestor system, an identity score request from the score requestor system; executing a read to at least one distributed node of the blockchain system to retrieve the data related to the plurality of identities of the identity user stored on the blockchain of the blockchain system; for each of the plurality of identities, determining a weight as a function of the retrieved data related to that identity; determining the identity score as a function of the weights for each of identities; and providing, by the identity system at the interface with the score requestor system, the determined identity score to the score requestor system.

[04c] According to a third aspect of the invention, there is provided a non-transitory machine-readable storage medium having program instructions, which when executed by a processor perform a method of providing an identity score to verify an identity, the method comprising: receiving, by an identity system at an interface to a user system, identity data from the user system, the identity data related to a plurality of identities of an identity user; receiving, by the identity system at one or more interfaces to one or more identity provider systems, validation data from the one or more identity provider systems, the validation data related to the identity data; upon the validation data indicating that the identity data is valid, generating one or more

transactions to store data related to each of the plurality of identities of the identity user on a blockchain of a blockchain system, the data to be stored including for each of the plurality of identities a representation of at least one of: the identity data, or the validation data; transmitting the one or more transactions to at least one distributed node of the blockchain system; executing a read to the blockchain system to retrieve the data related to the plurality of identities; determining the identity score as a combination of, for each of the plurality of identities, a respective quantity based on the retrieved data; and providing, by the identity system at an interface to a score requestor system, the identity score to the score requestor system.

[04d] According to a fourth aspect of the invention, there is provided a non-transitory machine-readable storage medium having program instructions, which when executed by a processor perform a method of providing an identity score to verify an identity, the method comprising: for each of a plurality of identities of an identity user, storing data related to validated identity data of the respective identity in a blockchain of a blockchain system; receiving, by an identity system at an interface with a score requestor system, an identity score request from the score requestor system; executing a read to at least one distributed node of the blockchain system to retrieve the data related to the plurality of identities of the identity user stored on the blockchain of the blockchain system; for each of the plurality of identities, determining a weight as a function of the retrieved data related to that identity; determining the identity score as a function of the weights for each of identities; and providing, by the identity system at the interface with the score requestor system, the determined identity score to the score requestor system.

[04e] According to a fifth aspect of the invention, there is provided a system for providing identity services, the system comprising: a processor; and a non-transitory machine-readable storage medium having program instructions, which when executed by the processor perform a method of providing an identity score to verify an identity, the method comprising: receiving, by an identity system at an interface to a user system, identity data from the user system, the identity data related to a plurality of identities of an identity user; receiving, by the identity system at one or more interfaces to one or more identity provider systems, validation data from the one or more identity provider systems, the validation data related to the identity data; upon the validation data indicating that the identity data is valid, generating one or more transactions to store data related to each of the plurality of identities of the identity user on a blockchain of

a blockchain system, the data to be stored including for each of the plurality of identities a representation of at least one of: the identity data, or the validation data; transmitting the one or more transactions to at least one distributed node of the blockchain system; executing a read to the blockchain system to retrieve the data related to the plurality of identities; determining the identity score as a combination of, for each of the plurality of identities, a respective quantity based on the retrieved data; and providing, by the identity system at an interface to a score requestor system, the identity score to the score requestor system.

BRIEF DESCRIPTION OF THE DRAWINGS

[05] So that the features of the present invention can be understood, a number of drawings are described below. However, the appended drawings illustrate only particular embodiments

WHAT IS CLAIMED IS:

1. A method of providing an identity score to verify an identity, the method comprising:

receiving, by an identity system at an interface to a user system, identity data from the user system, the identity data related to a plurality of identities of an identity user;

receiving, by the identity system at one or more interfaces to one or more identity provider systems, validation data from the one or more identity provider systems, the validation data related to the identity data;

upon the validation data indicating that the identity data is valid, generating one or more transactions to store data related to each of the plurality of identities of the identity user on a blockchain of a blockchain system, the data to be stored including for each of the plurality of identities a representation of at least one of: the identity data, or the validation data;

transmitting the one or more transactions to at least one distributed node of the blockchain system;

executing a read to the blockchain system to retrieve the data related to the plurality of identities;

determining the identity score as a combination of, for each of the plurality of identities, a respective quantity based on the retrieved data; and

providing, by the identity system at an interface to a score requestor system, the identity score to the score requestor system.

2. The method of claim 1, wherein the identity data includes an identifier identifying the identity.

3. The method of claim 1, wherein the identity data includes metadata describing the identity, the metadata including at least one of: a type of the identity, a validity date range of the identity, a security feature of the identity.

4. The method of claim 1, wherein the identity is issued by the identity provider.

5. The method of claim 1, wherein the identity includes at least one of: a government-issued identity, a bank account, a credit account, a social media account, or a biometric trait.

6. The method of claim 1, wherein the identity user is an individual.

7. The method of claim 1, wherein the identity user is an organization.

8. The method of claim 1, further comprising requesting the validation data from the identity provider in response to receiving the identity data.

9. The method of claim 1, wherein the receiving the identity data, receiving the validation data, generating the transaction, and transmitting the transaction are performed repeatedly over time to store data on the blockchain related to a plurality of different identities of the identity user.

10. The method of claim 1, further comprising cryptographically encoding the at least one of the identity data or validation data to generate the representation of the at least one of the identity data or validation data.

11. The method of claim 1, further comprising:

receiving an identity score request for the identity user from the identity score requestor.

12. The method of claim 11, wherein the identity score request is received from the score requestor system as part of an identification being conducted by the score requestor system on the identity user.

13. The method of claim 12, wherein the score requestor system includes at least one of: a point of sale device, a biometric scanning device, or a security authorization device.

14. The method of claim 11, further comprising using, by a device, the identity score to authorize or deny at least one of: a financial transaction, or entry to a space.

15. A method of providing an identity score to verify an identity, the method comprising:

for each of a plurality of identities of an identity user, storing data related to validated identity data of the respective identity in a blockchain of a blockchain system;

receiving, by an identity system at an interface with a score requestor system, an identity score request from the score requestor system;

executing a read to at least one distributed node of the blockchain system to retrieve the data related to the plurality of identities of the identity user stored on the blockchain of the blockchain system;

for each of the plurality of identities, determining a weight as a function of the retrieved data related to that identity;

determining the identity score as a function of the weights for each of identities; and

providing, by the identity system at the interface with the score requestor system, the determined identity score to the score requestor system.

16. The method of claim 15, wherein the identity score is determined as a sum of the weights of the identities.

17. The method of claim 15, wherein the identity score is determined as a sum of factors based on the weights of the identities.

18. The method of claim 15, wherein the retrieved data includes at least one of: a type of the identity, a validity data range of the identity, or a security feature of the identity.

19. The method of claim 15, wherein the executing the read, determining the weight, and determining the identity score are performed by the identity system.

20. The method of claim 15, wherein the score requestor system performs at least one of: the determining the weight, or the determining the identity score.

21. The method of claim 15, wherein the identity score request is received from the score requestor system as part of an identification being conducted by the score requestor system on the identity user.

22. The method of claim 21, wherein the identification is a governmental identification of the individual during at least one of: a border crossing, or a law enforcement detainment.

23. The method of claim 21, wherein the identification is a commercial identification of the individual during a financial transaction involving the identity user.

24. The method of claim 21, wherein the score requestor system includes at least one of: a point of sale device, a biometric scanning device, or a security authorization device.

25. The method of claim 21, further comprising using, by the score requestor system, the identity score to authorize or deny at least one of: a financial transaction, or entry to a space.

26. The method of claim 15, further comprising:

receiving identity data from the identity user, the identity data related to the one or more identities of the identity user; and

receiving validation data from an identity provider, the validation data related to the identity data.

27. A non-transitory machine-readable storage medium having program instructions, which when executed by a processor perform a method of providing an identity score to verify an identity, the method comprising:

receiving, by an identity system at an interface to a user system, identity data from the user system, the identity data related to a plurality of identities of an identity user;

receiving, by the identity system at one or more interfaces to one or more identity provider systems, validation data from the or more identity provider systems, the validation data related to the identity data;

upon the validation data indicating that the identity data is valid, generating one or more transactions to store data related to each of the plurality of identities of the identity user on a blockchain of a blockchain system, the data to be stored including for each of the plurality of identities a representation of at least one of: the identity data, or the validation data;

transmitting the one or more transactions to at least one distributed node of the blockchain system;

executing a read to the blockchain system to retrieve the data related to the plurality of identities;

determining the identity score as a combination of, for each of the plurality of identities, a respective quantity based on the retrieved data; and

providing, by the identity system at an interface to a score requestor system, the identity score to the score requestor system.

28. A non-transitory machine-readable storage medium having program instructions, which when executed by a processor perform a method of providing an identity score to verify an identity, the method comprising:

for each of a plurality of identities of an identity user, storing data related to validated identity data of the respective identity in a blockchain of a blockchain system;

receiving, by an identity system at an interface with a score requestor system, an identity score request from the score requestor system;

executing a read to at least one distributed node of the blockchain system to retrieve the data related to the plurality of identities of the identity user stored on the blockchain of the blockchain system;

for each of the plurality of identities, determining a weight as a function of the retrieved data related to that identity;

determining the identity score as a function of the weights for each of identities; and

providing, by the identity system at the interface with the score requestor system, the determined identity score to the score requestor system.

29. A system for providing identity services, the system comprising:

a processor; and

a non-transitory machine-readable storage medium having program instructions, which when executed by the processor perform a method of providing an identity score to verify an identity, the method comprising:

receiving, by an identity system at an interface to a user system, identity data from the user system, the identity data related to a plurality of identities of an identity user;

receiving, by the identity system at one or more interfaces to one or more identity provider systems, validation data from the one or more identity provider systems, the validation data related to the identity data;

upon the validation data indicating that the identity data is valid, generating one or more transactions to store data related to each of the plurality of identities of the identity user on a blockchain of a blockchain system, the data to be stored including for each of the plurality of identities a representation of at least one of: the identity data, or the validation data;

transmitting the one or more transactions to at least one distributed node of the blockchain system

executing a read to the blockchain system to retrieve the data related to the plurality of identities;

determining the identity score as a combination of, for each of the plurality of identities, a respective quantity based on the retrieved data; and

providing, by the identity system at an interface to a score requestor system, the identity score to the score requestor system.

30. The system of claim 29, the method further comprising:

receiving an identity score request for the identity user from the identity score requestor.