

Claims

1. A method executed by at least one computing device for governing object transactions on a distributed ledger over a computer network whereby reusable policy can be enforced on a per transaction basis in substantially real time without consulting a centralized approval authority, the distributed ledger being a cryptographically secured ledger that includes shared nodes respectively executed by multiple parties and uses a consensus mechanism between the parties to authorize transactions to be entered on the ledger, the method comprising:
 - receiving a request message, to engage in a transaction with respect to at least one object, the request message being received from a decentralized node corresponding to a requesting participant on the distributed ledger, the at least one object having object attribute values associated therewith which describe an underlying asset, the request message including a requested action, an object affected by the action, and participant attribute values of the requesting participant;
 - engaging, by a policy enforcement point, in a transaction authorization process by identifying and interpreting applicable policy for the requested action including evaluation of rules and data in substantially real-time, the transaction authorization process including:
 - identifying a transaction policy, from amongst plural transaction policies, based on the requested transaction, attribute values of the requesting participant and the object specified by the request message, each transaction policy including configurable machine readable code specifying at least one rule to be enforced, wherein the transaction execution logic is stored on a centralized system, wherein the at least one rule is stored on the distributed ledger and includes a comparison operator, an attribute and a desired value for comparison, wherein the attribute includes a pointer to attribute data stored in at least one data source, and wherein the attribute data is required for policy evaluation and is to be applied at the time of policy evaluation;
 - collecting the attribute data from the at least one data source in substantially real-time by following the pointer to the data source, wherein the attribute data is relevant to at least one of the action, the object, and/or participants;
 - executing, by a decentralized rules engine machine-readable evaluation code stored on the distributed ledger, the evaluation code being configured to evaluate rules of the policy corresponding to the object and the requested action to thereby determine if the action can be authorized in response to the request message by applying the at least one rule in the identified policy and the external data in substantially real time with respect to the request; and
 - receiving, by the policy enforcement point, an authorization determination indicating whether the action can be authorized in accordance with the request message; and

granting a right to perform the requested action and returning transaction process control to the transaction execution logic when the authorization determination is positive to thereby facilitate completion of the action and cancelling the transaction processing when the authorization determination is negative.

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2. The method of claim 1, wherein the other parameters associated with the transaction include at least one of a transaction amount, price, transaction destination, other assets and/or participants.

10 3. The method of claim 1, wherein the rules are configured to be can be combined using at least one of Boolean logic, fuzzy logic, and/ or parameter weighting.

15 4. The method of claim 1, wherein the attribute data includes data indicating at least one of participant regulatory qualifications, participant residence, participant citizenship, asset regulatory framework, allowed transaction characteristics, and/or jurisdiction.

5. The method of claim 1, wherein the granting rights includes retrieving, from a cache, rights which have been evaluated based on the policy, the attribute data, and the object.

20 6. The method of claim 1, wherein the policy is a codification of at least one of issuer policies, international securities laws and regulations, and/or other transaction controls into pseudo code.

25 7. The method of claim 1, wherein a verified identity of each participant is mapped to a wallet address to and wherein the request message includes the wallet address mapped to the requesting participant.

8. The method of claim 1, further comprising communicating through an interoperability layer and decorator pattern to govern financial transactions across multiple dissimilar traditional or distributed ledgers.

30 9. A system for governing object transactions on a distributed ledger over a computer network whereby reusable policy can be enforced on a per transaction basis in substantially real time without consulting a centralized approval authority, the distributed ledger being a cryptographically secured ledger that includes shared nodes respectively executed by multiple parties and uses a consensus mechanism between the parties to authorize transactions to be entered on the ledger, the system comprising:

35 at least one computer processor; and

at least one memory having instructions stored therein which, when executed by the at least one computer processor, cause the at least one computer processor to:

receive a request message, to engage in a transaction with respect to at least one object, the request message being received from a decentralized node corresponding to a requesting participant on the distributed ledger, the at least one object having object attribute values associated therewith which describe an underlying asset, the request message including a requested action, an object affected by the action, and participant attribute values of the requesting participant;

engage, by a policy enforcement point, in a transaction authorization process by identifying and interpreting applicable policy for the requested action including evaluation of rules and data in substantially real-time, the transaction authorization process including:

identifying a transaction policy, from amongst plural transaction policies, based on the requested transaction, attribute values of the requesting participant and the object specified by the request message, each transaction policy including configurable machine readable code specifying at least one rule to be enforced, wherein the transaction execution logic is stored on a centralized system, wherein the at least one rule is stored on the distributed ledger and includes a comparison operator, an attribute and a desired value for comparison, wherein the attribute includes a pointer to attribute data stored in at least one data source, and wherein the attribute data is required for policy evaluation and is to be applied at the time of policy evaluation;

collecting the attribute data from the at least one data source in substantially real-time by following the pointer to the data source, wherein the attribute data is relevant to at least one of the action, the object, and/or participants;

executing, by a decentralized rules engine machine-readable evaluation code stored on the distributed ledger, the evaluation code being configured to evaluate rules of the transaction policy corresponding to the object and the requested action to thereby determine if the action can be authorized in response to the request message by applying the at least one rule in the identified policy and the external data in substantially real time with respect to the request; and

receiving, by the policy enforcement point, an authorization determination indicating whether the action can be authorized in accordance with the request message; and

grant a right to perform the requested action and returning transaction process control to distinct transaction execution logic when the authorization determination is positive to thereby facilitate completion of the action and cancelling the transaction processing when the authorization determination is negative.

10. The system of claim 9, wherein the other parameters associated with the transaction include at least one of a transaction amount, price, transaction destination, other assets and/or participants.

11. The system of claim 9, wherein the rules are configured to be can be combined using at least one of Boolean logic, fuzzy logic, and/ or parameter weighting.

5 12. The system of claim 9, wherein the attribute data includes data indicating at least one of participant regulatory qualifications, participant residence, participant citizenship, asset regulatory framework, allowed transaction characteristics, and/or jurisdiction.

10 13. The system of claim 9, wherein the granting rights includes retrieving, from a cache, rights which have been evaluated based on the policy, the attribute data, and the object.

14. The system of claim 9, wherein the policy is a codification of at least one of issuer policies, international securities laws and regulations, and/or other transaction controls into pseudo code.

15 15. The system of claim 9 wherein a verified identity of each participant is mapped to a wallet address to and wherein the request message includes the wallet address mapped to the requesting participant.

20 16. The system of claim 9, wherein communications occur through an interoperability layer and decorator pattern to govern financial transactions across multiple dissimilar traditional or distributed ledgers.

17. Non-transient computer readable media storing instructions therein which, when executed by at least one computer processor, cause the at least one computer processor to accomplish steps of governing tokenized transactions on a distributed ledger over a computer network, whereby reusable policy can be enforced on a per transaction basis in substantially real time without consulting a centralized approval authority, the distributed ledger being a cryptographically secured ledger that includes shared nodes respectively executed by multiple parties and uses a consensus mechanism between the parties to authorize transactions to be entered on the ledger,, the steps comprising:

30 receiving a request message, to engage in a transaction with respect to at least one object, the request message being received from a decentralized node corresponding to a requesting participant on the distributed ledger, the at least one object having object attribute values associated therewith which describe an underlying asset, the request message including a requested action, an object affected by the action, and participant attribute values of the requesting participant;

engaging, by a policy enforcement point, in a transaction authorization process by identifying and interpreting applicable policy for the requested action including evaluation of rules and data in substantially real-time, the transaction authorization process including:

identifying a transaction policy, from amongst plural transaction policies, based on the requested transaction, attribute values of the requesting participant and the object specified by the request message, each transaction policy including configurable machine readable code specifying at least one rule to be enforced, wherein the transaction execution logic is stored on a centralized system, wherein the at least one rule is stored on the distributed ledger and includes a comparison operator, an attribute and a desired value for comparison, wherein the attribute includes a pointer to attribute data stored in at least one data source, and wherein the attribute data is required for policy evaluation and is to be applied at the time of policy evaluation;

collecting the attribute data from the at least one data source in substantially real-time by following the pointer to the data source, wherein the attribute data is relevant to at least one of the action, the object, and/or participants;

executing, by a decentralized rules engine machine-readable evaluation code stored on the distributed ledger, the evaluation code being configured to evaluate rules of the policy corresponding to the object and the requested action to thereby determine if the action can be authorized in response to the request message by applying the at least one rule in the identified policy and the external data in substantially real time with respect to the request; and

receiving, by the policy enforcement point, an authorization determination indicating whether the action can be authorized in accordance with the request message; and

granting a right to perform the requested action and returning transaction process control to distinct transaction execution logic when the authorization determination is positive to thereby facilitate completion of the action and cancelling the transaction processing when the authorization determination is negative.

18. The media of claim 17, wherein the other parameters associated with the transaction include at least one of a transaction amount, price, transaction destination, other assets and/or participants.

19. The media of claim 17, wherein the rules are configured to be can be combined using at least one of Boolean logic, fuzzy logic, and/ or parameter weighting.

20. The media of claim 17, wherein the attribute data includes data indicating at least one of participant regulatory qualifications, participant residence, participant citizenship, asset regulatory framework, allowed transaction characteristics, and/or jurisdiction.

21. The media of claim 17, wherein the granting rights includes retrieving, from a cache, rights which have been evaluated based on the policy, the attribute data, and the object.

5 22. The media of claim 17, wherein the policy is a codification of at least one of issuer policies, international securities laws and regulations, and/or other transaction controls into pseudo code.

10 23. The media of claim 17, wherein a verified identity of each participant is mapped to a wallet address to and wherein the request message includes the wallet address mapped to the requesting participant.

24. The media of claim 19, wherein communications occur through an interoperability layer and decorator pattern to govern financial transactions across multiple dissimilar traditional or distributed ledgers.