

CLAIMS

1. An operation management method of a distributed ledger system comprising a plurality of nodes, wherein:

each of at least two or more predetermined nodes in the plurality of nodes manages an operation smart contract for operation management of the distributed ledger system with a distributed ledger, the operation smart contract holding at least any one of an identifier identifying a type of an operation and procedure information of the operation;

when at least one node in the two or more predetermined nodes receives a transaction of the operation smart contract, the node which has received the transaction executes the operation smart contract, in response to the execution of the operation smart contract, either of the node or an operation smart contract associated with the node executes an operation work according to at least any one of the identifier identifying the type of the operation held in the operation smart contract and the procedure information of the operation for a node being a target of the operation.

2. The operation management method according to claim 1, wherein the operation smart contract holds a data structure managing an execution history of the operation work for the identifier identifying the type of the operation,

the operation smart contract includes an acceptance

phase of an operation work and a confirmation phase of completion of the execution, and, as an internal processing of the operation smart contract, includes an individual registration step registering each completion of the execution in each node in the execution history in the confirmation phase of completion of the execution and a completion judgement step judging the completion of the entire operation work by confirming the registration status referring to the registration of the completion of the execution including those at the other nodes in the execution history.

3. The operation management method according to claim 2, wherein the node which has received the transaction in the distributed ledger system executes the operational smart contract and makes the transaction in the confirmation phase of the execution completion include an evidence of completion or information associated with the evidence of the completion, and as an internal processing of the operation smart contract, the node which has received the transaction in the distributed ledger system registers an evidence of completion at each of the nodes at the individual registration step as the execution history or as information linked with the execution history, and utilizes the evidence of the completion to the completion judgement of the entirety

of the operation work as a condition for the judgement of the completion at the completion judgement step.

4. The operation management method according to claim 3,
5 wherein, the operation smart contract further holds recovery procedure information corresponding to an identifier identifying a type of an operation, when the node which has received the transaction in the distributed ledger system has failed to complete execution in the confirmation phase
10 of the execution completion as a result of execution of the operation smart contract, a predetermined recovery or re-execution process according to the recovery procedure information in the operation smart contract may be performed.

15 5. The operation management method according to claim 1, wherein the operation smart contract holds a data structure for managing an execution history of at least any one of registration of an operation work and execution of an operation work for each identifier identifying a type of an
20 operation,

the operation smart contract includes an approval phase in at least one of registration and execution of a smart contract, and includes, as an internal processing of the operation smart contract, an individual registration
25 step registering each completion of the execution in each

node in the execution history in a confirmation phase of completion of the execution and a completion judgement step judging the completion of the entire operation work by confirming the registration status referring to the registration of the completion of the execution including those at the other nodes in the execution history.

6. The operation management method according to claim 1, wherein a node which is not in charge of executing a business smart contract for business among the two or more predetermined nodes participates in a network and executes the operation smart contract as a participant of a business network constituted by the distributed ledger system or a node participating in consensus formation of the operation smart contract.

7. The operation management method according to claim 1, wherein the node that has received the transaction in the distributed ledger system issues a deployment transaction for adding/updating the operation smart contract and an operation execution transaction for executing the operation work defined by the operation smart contract with respect to the operation smart contract, and verifies correctness of an operation execution program to be used for the operation work at the time of issuing at least one of the deployment

transaction and the operation execution transaction by calculating a hush value of the operation execution program and judging based on whether or not the hush value matches a hush value calculated in advance and held as an internal
5 variable of the operation smart contract or a hush value related to the operation execution program on the other node.

8. The operation management method according to claim 1, wherein the operation execution program stored in the node
10 which has received the transaction in the distributed ledger system or the operation execution program associated with the node executes the operation work according to the predetermined operation smart contract.

15 9. The operation management method according to claim 1, wherein a node which has executed the operation smart contract in the two or more predetermined nodes issues an event related to the operation work including an identifier identifying at least the content of the operation indicating
20 that the operation smart contract has been executed at the time of execution of the operation smart contract, and an operation execution program which is held by the two or more predetermined nodes or associated with the node executes the operation work according to at least the content identified
25 by the identifier in response to the event.

10. The operation management method according to claim 9,
wherein, as at least a part of the operation procedure
information, at least any one of one or more operation
5 command string, a program to be called, a source code
describing operation content, and information of the node to
be operated is embedded in the event, and the operation
execution program executes the operation work according to
the embedded procedure information.

10

11. The operation management method according to claim 1,
wherein the plurality of nodes in the distributed ledger
system manage a smart contract for operation management of
a distributed processing system different from the
15 distributed ledger system by a distributed ledger, execute
the smart contract, and perform operation management of the
distributed processing node in the distributed processing
system.

20 12. An operation management system comprising a plurality
of nodes of a distributed ledger system, wherein:

each of at least two or more predetermined nodes in
the plurality of nodes manages an operation smart contract
for operation management of the distributed ledger system
25 with a distributed ledger, the operation smart contract

holding at least any one of an identifier identifying a type of an operation and procedure information of the operation;

when at least one node in the two or more predetermined nodes receives a transaction of the operation smart contract,
5 the node which has received the transaction executes the operation smart contract, in response to the execution of the operation smart contract, either of the node or an operation smart contract associated with the node executes an operation work according to at least any one of the
10 identifier identifying the type of the operation held in the operation smart contract and the procedure information of the operation for a node being a target of the operation.

13. An operation management program for a distributed
15 ledger system comprising a plurality of nodes, the operation management program causing:

each of at least two or more predetermined nodes in the plurality of nodes to manage an operation smart contract for operation management of the distributed ledger system
20 with a distributed ledger, the operation smart contract holding at least any one of an identifier identifying a type of an operation and procedure information of the operation;

when at least one node in the two or more predetermined nodes receives a transaction of the operation smart contract,
25 the node which has received the transaction to execute the

operation smart contract, in response to the execution of
the operation smart contract, either of the node or an
operation smart contract associated with the node executes
an operation work according to at least any one of the
5 identifier identifying the type of the operation held in the
operation smart contract and the procedure information of
the operation for a node being a target of the operation.