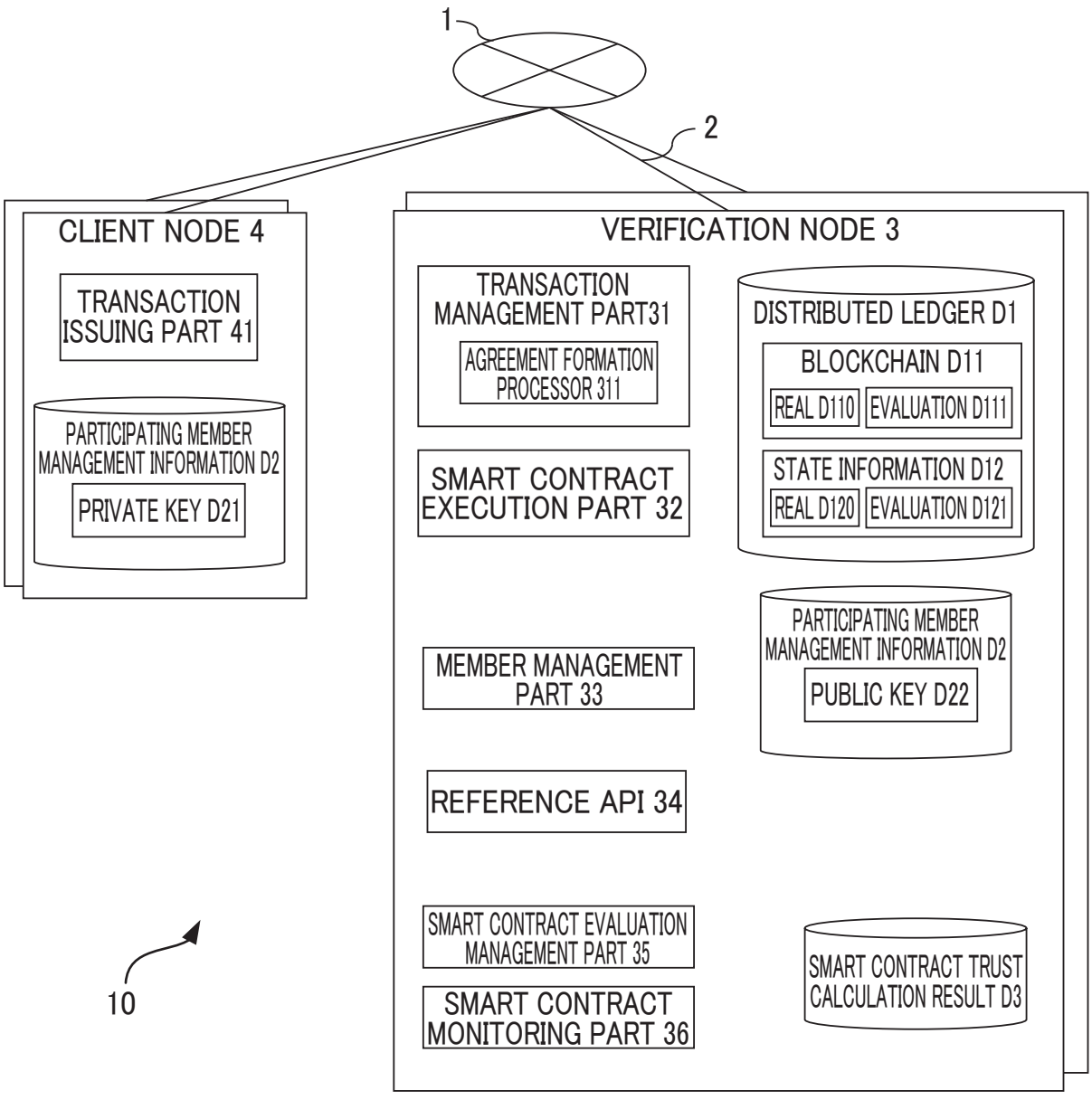

1
2
CLIENT NODE 4
TRANSACTION ISSUING PART 41
PARTICIPATING MEMBER MANAGEMENT INFORMATION D2
PRIVATE KEY D21
VERIFICATION NODE 3
TRANSACTION MANAGEMENT PART31
AGREEMENT FORMATION PROCESSOR 311
SMART CONTRACT EXECUTION PART 32
MEMBER MANAGEMENT PART 33
REFERENCE API 34
SMART CONTRACT EVALUATION MANAGEMENT PART 35
SMART CONTRACT MONITORING PART 36
DISTRIBUTED LEDGER D1
BLOCKCHAIN D11
REAL D110
EVALUATION D111
STATE INFORMATION D12
REAL D120
EVALUATION D121
PARTICIPATING MEMBER MANAGEMENT INFORMATION D2
PUBLIC KEY D22
SMART CONTRACT TRUST CALCULATION RESULT D3
10

FIG. 1

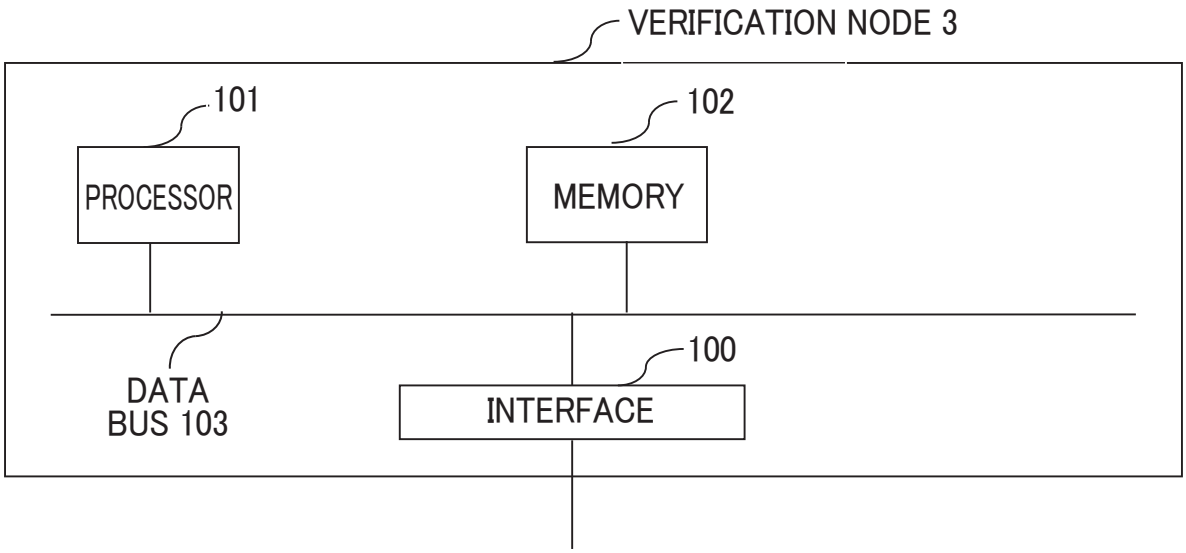

VERIFICATION NODE 3
101
PROCESSOR
102
MEMORY
DATA
BUS 103
100
INTERFACE

FIG. 2

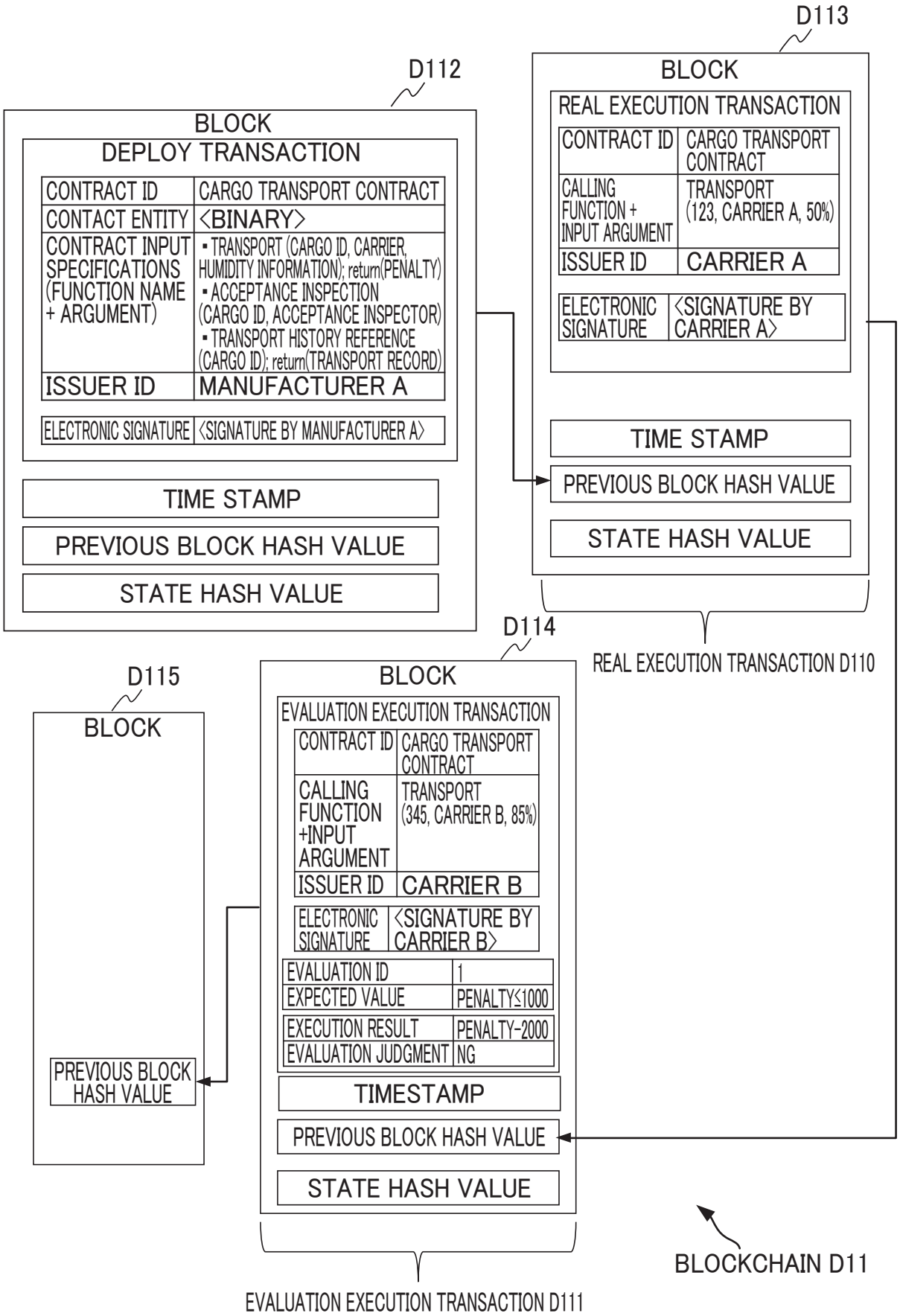

D112
BLOCK
DEPLOY TRANSACTION
CONTRACT ID
CARGO TRANSPORT CONTRACT
CONTACT ENTITY
<BINARY>
CONTRACT INPUT SPECIFICATIONS (FUNCTION NAME + ARGUMENT)
▪ TRANSPORT (CARGO ID, CARRIER, HUMIDITY INFORMATION); return(PENALTY)
▪ ACCEPTANCE INSPECTION (CARGO ID, ACCEPTANCE INSPECTOR)
▪ TRANSPORT HISTORY REFERENCE (CARGO ID); return(TRANSPORT RECORD)
ISSUER ID
MANUFACTURER A
ELECTRONIC SIGNATURE
<SIGNATURE BY MANUFACTURER A>
TIME STAMP
PREVIOUS BLOCK HASH VALUE
STATE HASH VALUE
D113
BLOCK
REAL EXECUTION TRANSACTION
CONTRACT ID
CARGO TRANSPORT CONTRACT
CALLING FUNCTION + INPUT ARGUMENT
TRANSPORT (123, CARRIER A, 50%)
ISSUER ID
CARRIER A
ELECTRONIC SIGNATURE
<SIGNATURE BY CARRIER A>
TIME STAMP
PREVIOUS BLOCK HASH VALUE
STATE HASH VALUE
REAL EXECUTION TRANSACTION D110
D114
BLOCK
EVALUATION EXECUTION TRANSACTION
CONTRACT ID
CARGO TRANSPORT CONTRACT
CALLING FUNCTION +INPUT ARGUMENT
TRANSPORT (345, CARRIER B, 85%)
ISSUER ID
CARRIER B
ELECTRONIC SIGNATURE
<SIGNATURE BY CARRIER B>
EVALUATION ID
1
EXPECTED VALUE
PENALTY≤1000
EXECUTION RESULT
PENALTY=2000
EVALUATION JUDGMENT
NG
TIMESTAMP
PREVIOUS BLOCK HASH VALUE
STATE HASH VALUE
D115
BLOCK
PREVIOUS BLOCK HASH VALUE
BLOCKCHAIN D11
EVALUATION EXECUTION TRANSACTION D111

FIG. 3

STATE INFORMATION D12

D1201 CONTRACT ID	D1202 CONTRACT ENTITY	D1203 SPACE	D1204 INTERNAL TABLE
CARGO TRANSPORT CONTRACT	〈BINARY〉	REAL	
		EVALUATION (ID:1)	
		EVALUATION (ID:2)	···
···	···	···	···

REAL

CARGO ID	TIME	CONDITION	OPERATOR	MAXIMUM HUMIDITY	CONTRACT	PENALTY
···	···	···	···	···	···	···
123	2016/09/01 10:00	ARRIVAL AT STOPPING POINT	CARRIER A	60%	OBSERVED	0
···	···	···	···	···	···	···
125	2016/09/03 12:00	SHIPPING COMPLETE	RETAILER A	70%	OBSERVED	0
···	···	···	···	···	···	···
234	2016/09/04 12:30	ARRIVAL AT STOPPING POINT	CARRIER B	85%	VIOLATED	2000
···	···	···	···	···	···	···

D120

EVALUATION (ID:1)

CARGO ID	TIME	CONDITION	OPERATOR	MAXIMUM HUMIDITY	CONTRACT	PENALTY
···	···	···	···	···	···	···
345	2016/09/01 10:00	ARRIVAL AT STOPPING POINT	CARRIER a	85%	VIOLATED	2000
···	···	···	···	···	···	···
456	2016/09/03 12:00	ARRIVAL AT STOPPING POINT	CARRIER b	75%	OBSERVED	0
···	···	···	···	···	···	···
567	2016/09/04 12:30	ARRIVAL AT STOPPING POINT	CARRIER b	90%	VIOLATED	4000
···	···	···	···	···	···	···

D121

FIG. 4

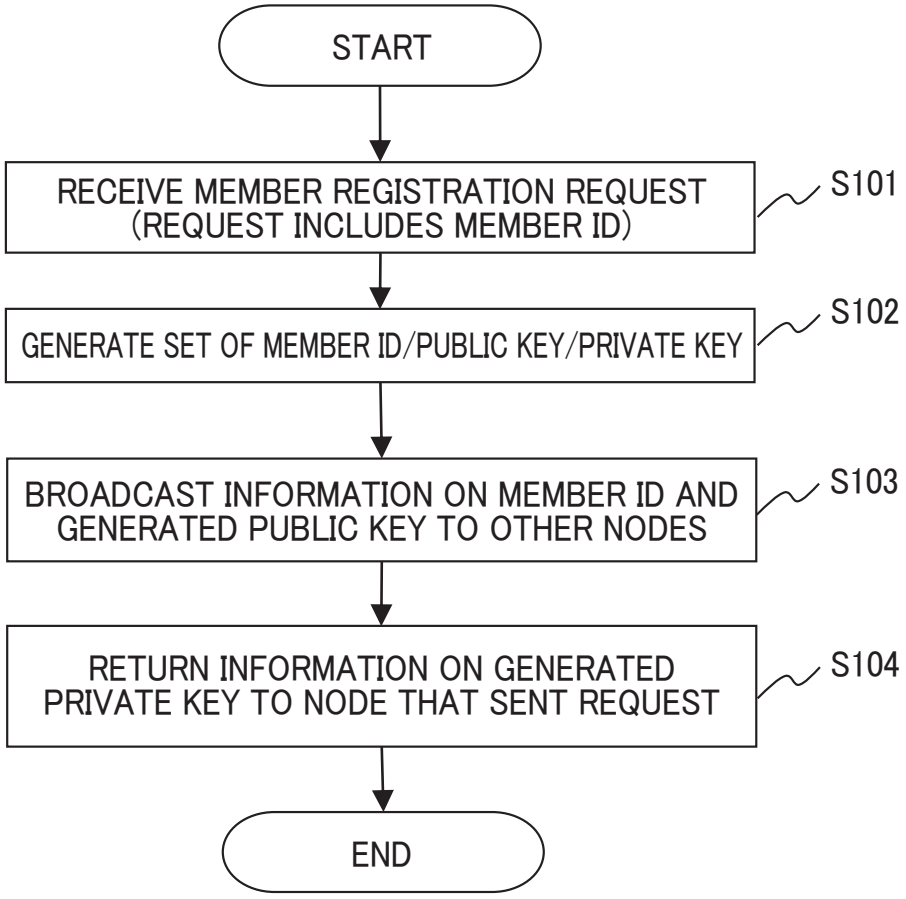

START
RECEIVE MEMBER REGISTRATION REQUEST (REQUEST INCLUDES MEMBER ID)
S101
GENERATE SET OF MEMBER ID/PUBLIC KEY/PRIVATE KEY
S102
BROADCAST INFORMATION ON MEMBER ID AND GENERATED PUBLIC KEY TO OTHER NODES
S103
RETURN INFORMATION ON GENERATED PRIVATE KEY TO NODE THAT SENT REQUEST
S104
END

FIG. 5

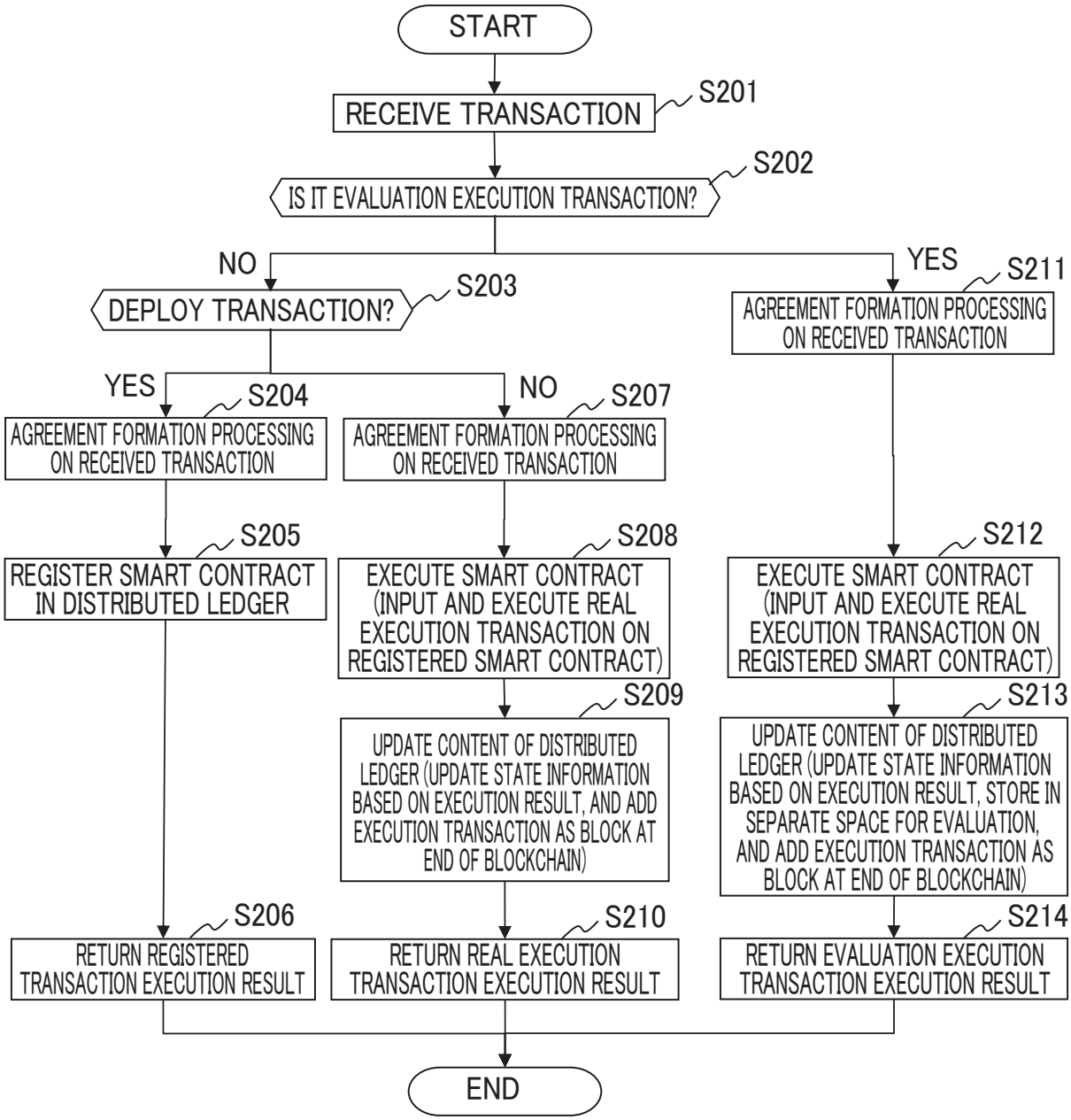

START
RECEIVE TRANSACTION
S201
IS IT EVALUATION EXECUTION TRANSACTION?
S202
NO
YES
DEPLOY TRANSACTION?
S203
S211
AGREEMENT FORMATION PROCESSING ON RECEIVED TRANSACTION
YES
NO
S204
S207
AGREEMENT FORMATION PROCESSING ON RECEIVED TRANSACTION
AGREEMENT FORMATION PROCESSING ON RECEIVED TRANSACTION
S205
S208
S212
REGISTER SMART CONTRACT IN DISTRIBUTED LEDGER
EXECUTE SMART CONTRACT (INPUT AND EXECUTE REAL EXECUTION TRANSACTION ON REGISTERED SMART CONTRACT)
EXECUTE SMART CONTRACT (INPUT AND EXECUTE REAL EXECUTION TRANSACTION ON REGISTERED SMART CONTRACT)
S209
S213
UPDATE CONTENT OF DISTRIBUTED LEDGER (UPDATE STATE INFORMATION BASED ON EXECUTION RESULT, AND ADD EXECUTION TRANSACTION AS BLOCK AT END OF BLOCKCHAIN)
UPDATE CONTENT OF DISTRIBUTED LEDGER (UPDATE STATE INFORMATION BASED ON EXECUTION RESULT, STORE IN SEPARATE SPACE FOR EVALUATION, AND ADD EXECUTION TRANSACTION AS BLOCK AT END OF BLOCKCHAIN)
S206
S210
S214
RETURN REGISTERED TRANSACTION EXECUTION RESULT
RETURN REAL EXECUTION TRANSACTION EXECUTION RESULT
RETURN EVALUATION EXECUTION TRANSACTION EXECUTION RESULT
END

FIG. 6

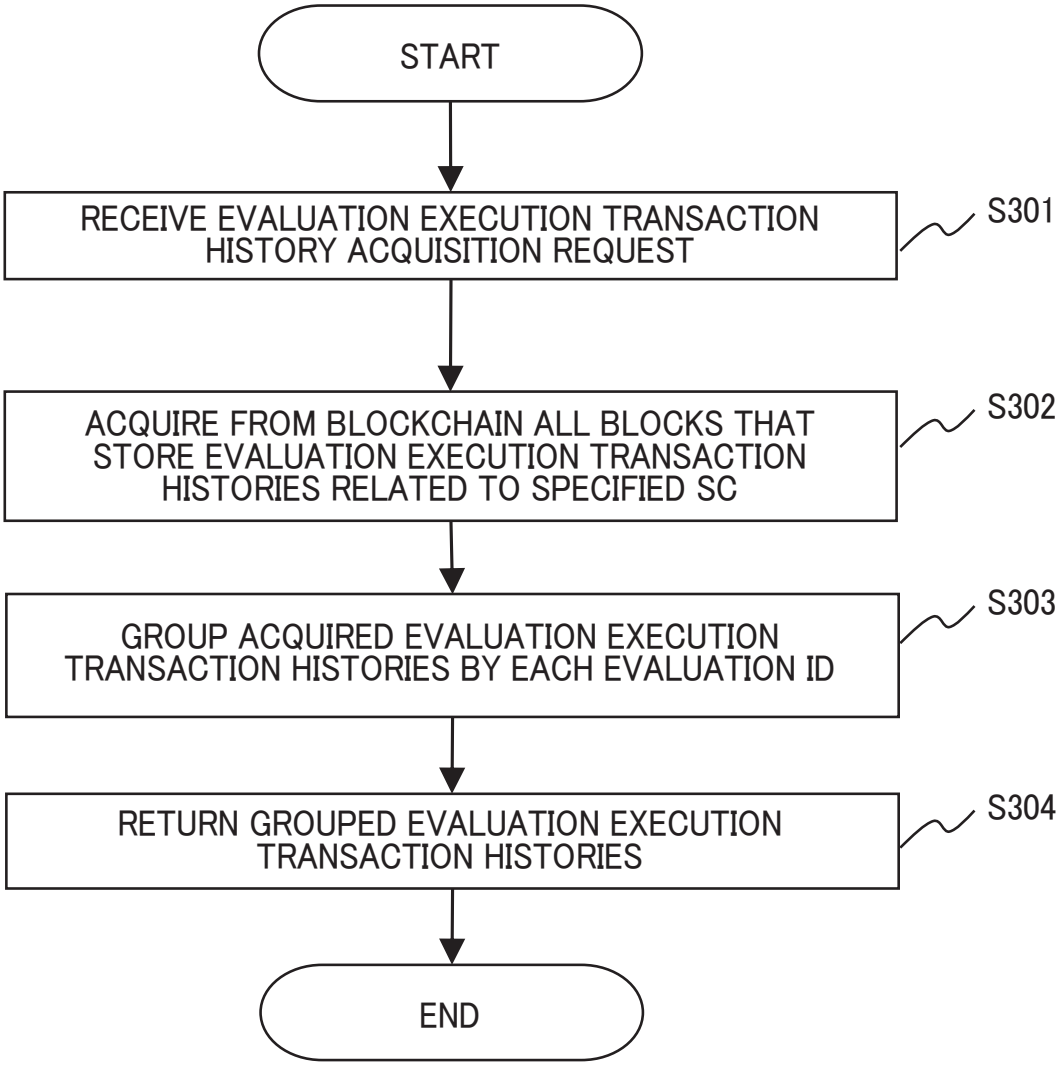

START
RECEIVE EVALUATION EXECUTION TRANSACTION HISTORY ACQUISITION REQUEST
S301
ACQUIRE FROM BLOCKCHAIN ALL BLOCKS THAT STORE EVALUATION EXECUTION TRANSACTION HISTORIES RELATED TO SPECIFIED SC
S302
GROUP ACQUIRED EVALUATION EXECUTION TRANSACTION HISTORIES BY EACH EVALUATION ID
S303
RETURN GROUPED EVALUATION EXECUTION TRANSACTION HISTORIES
S304
END

FIG. 7

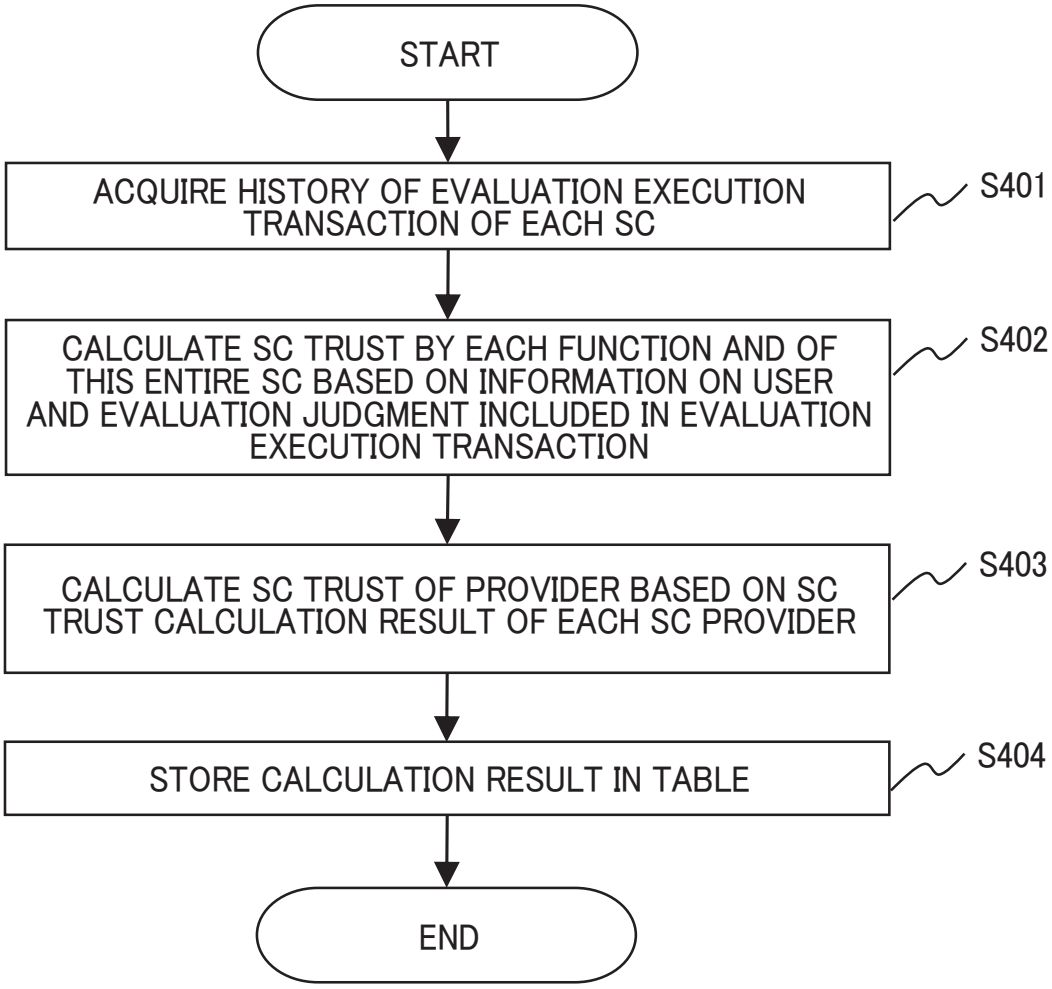

START
ACQUIRE HISTORY OF EVALUATION EXECUTION TRANSACTION OF EACH SC
S401
CALCULATE SC TRUST BY EACH FUNCTION AND OF THIS ENTIRE SC BASED ON INFORMATION ON USER AND EVALUATION JUDGMENT INCLUDED IN EVALUATION EXECUTION TRANSACTION
S402
CALCULATE SC TRUST OF PROVIDER BASED ON SC TRUST CALCULATION RESULT OF EACH SC PROVIDER
S403
STORE CALCULATION RESULT IN TABLE
S404
END

FIG. 8

SMART CONTRACT TRUST D3

D301 PROVIDER	D302 CONTRACT ID	D303 FUNCTION NAME	D304 TRUST	D305 EVALUATOR	
…	…	…	…	…	
MANUFACTURING BUSINESS A	CARGO TRANSPORT CONTRACT	TRANSPORT	0.88	CARRIER A, CARRIER B, MANUFACTURING BUSINESS A	D311
…	…	…	…	…	
MANUFACTURING BUSINESS A	CARGO TRANSPORT CONTRACT	–	0.85	(OMITTED)	D312
…	…	…	…	…	
MANUFACTURING BUSINESS A	–	–	0.83	(OMITTED)	D313
…	…	…	…	…	

FIG. 9

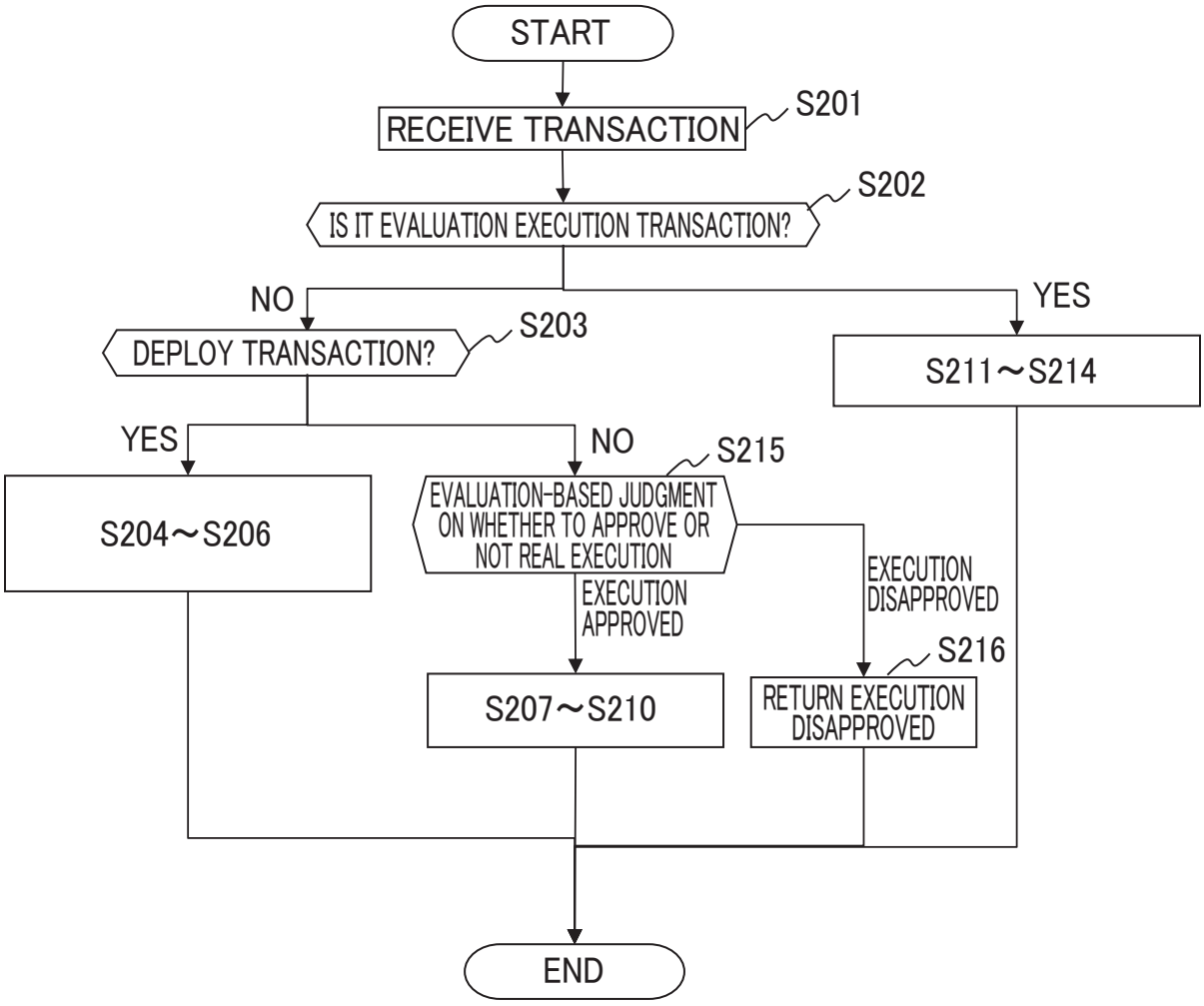

START
RECEIVE TRANSACTION
S201
IS IT EVALUATION EXECUTION TRANSACTION?
S202
NO
YES
DEPLOY TRANSACTION?
S203
S211～S214
YES
NO
S215
S204～S206
EVALUATION-BASED JUDGMENT ON WHETHER TO APPROVE OR NOT REAL EXECUTION
EXECUTION APPROVED
EXECUTION DISAPPROVED
S216
S207～S210
RETURN EXECUTION DISAPPROVED
END

FIG. 10

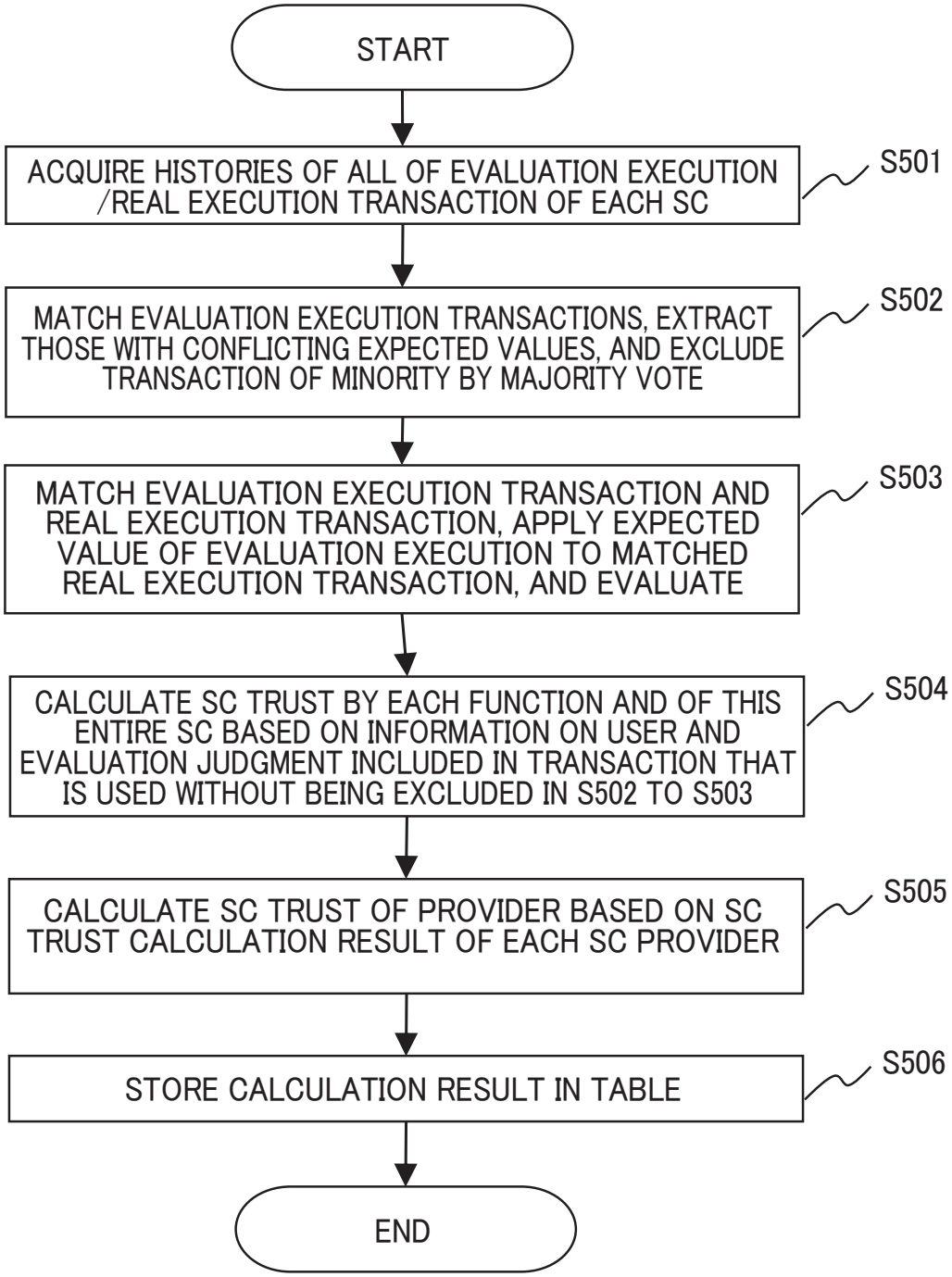

START
ACQUIRE HISTORIES OF ALL OF EVALUATION EXECUTION /REAL EXECUTION TRANSACTION OF EACH SC
S501
MATCH EVALUATION EXECUTION TRANSACTIONS, EXTRACT THOSE WITH CONFLICTING EXPECTED VALUES, AND EXCLUDE TRANSACTION OF MINORITY BY MAJORITY VOTE
S502
MATCH EVALUATION EXECUTION TRANSACTION AND REAL EXECUTION TRANSACTION, APPLY EXPECTED VALUE OF EVALUATION EXECUTION TO MATCHED REAL EXECUTION TRANSACTION, AND EVALUATE
S503
CALCULATE SC TRUST BY EACH FUNCTION AND OF THIS ENTIRE SC BASED ON INFORMATION ON USER AND EVALUATION JUDGMENT INCLUDED IN TRANSACTION THAT IS USED WITHOUT BEING EXCLUDED IN S502 TO S503
S504
CALCULATE SC TRUST OF PROVIDER BASED ON SC TRUST CALCULATION RESULT OF EACH SC PROVIDER
S505
STORE CALCULATION RESULT IN TABLE
S506
END

FIG. 11

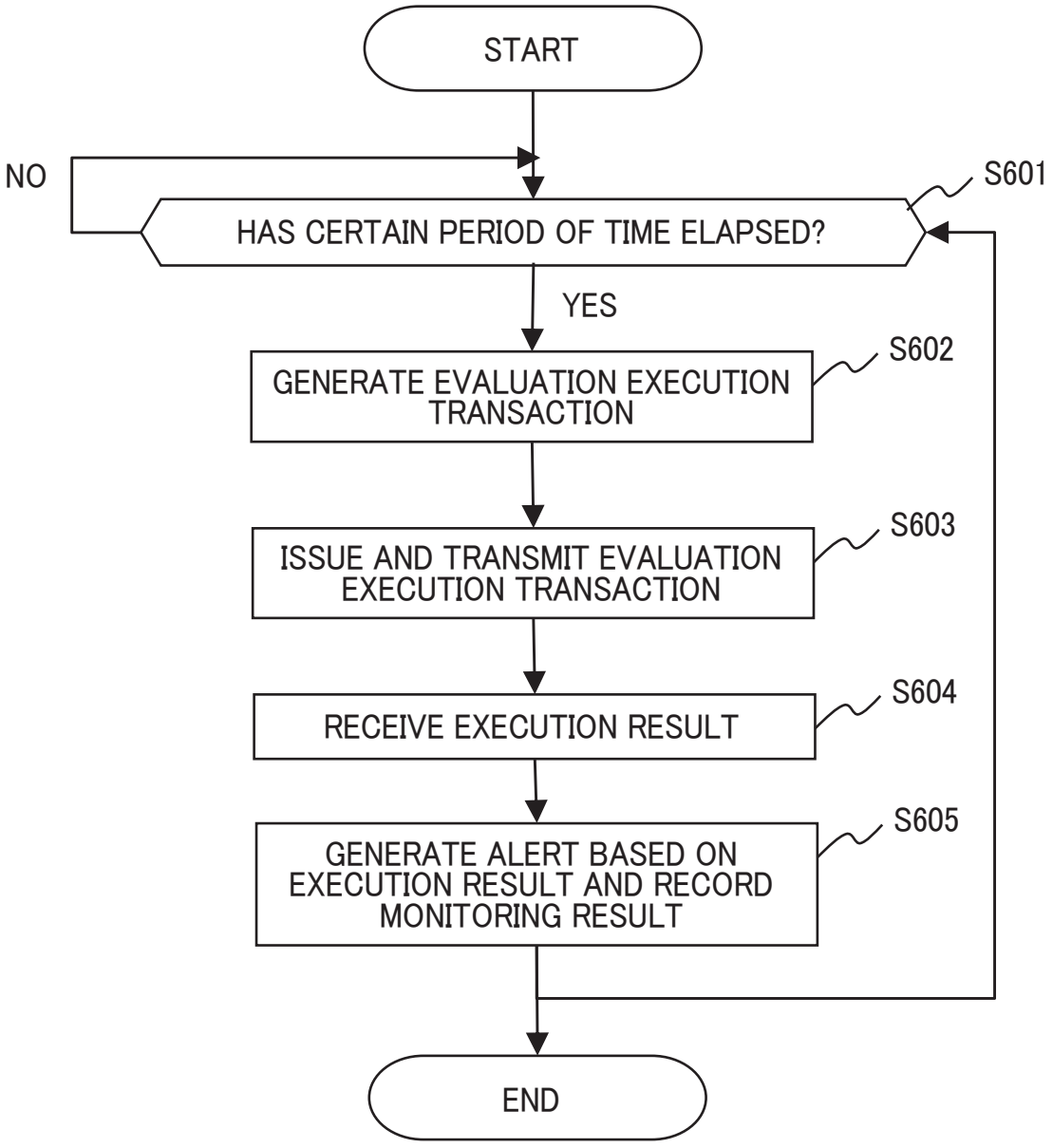

START
NO
S601
HAS CERTAIN PERIOD OF TIME ELAPSED?
YES
S602
GENERATE EVALUATION EXECUTION TRANSACTION
S603
ISSUE AND TRANSMIT EVALUATION EXECUTION TRANSACTION
S604
RECEIVE EXECUTION RESULT
S605
GENERATE ALERT BASED ON EXECUTION RESULT AND RECORD MONITORING RESULT
END

FIG. 12

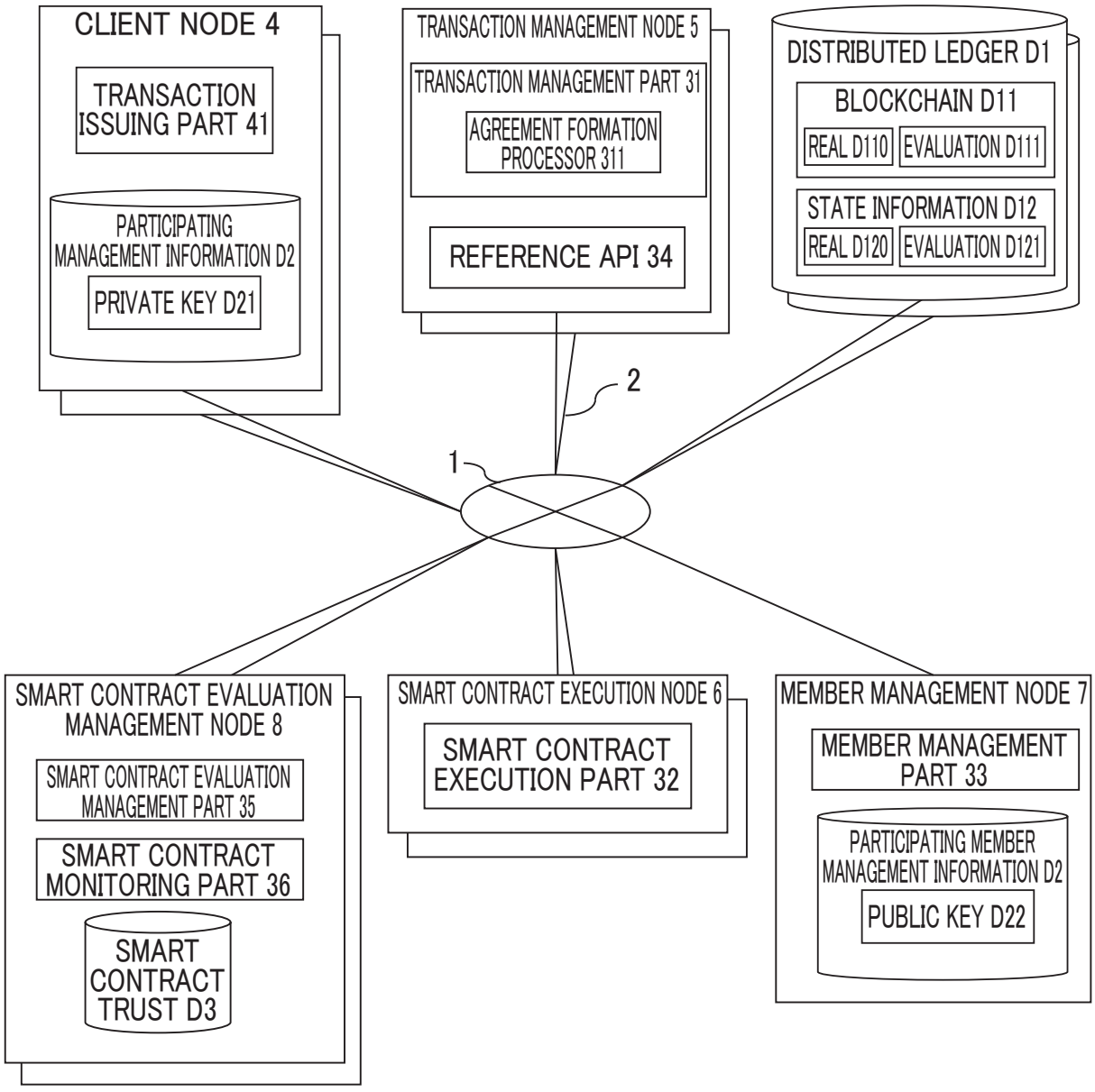

CLIENT NODE 4
TRANSACTION ISSUING PART 41
PARTICIPATING MANAGEMENT INFORMATION D2
PRIVATE KEY D21
TRANSACTION MANAGEMENT NODE 5
TRANSACTION MANAGEMENT PART 31
AGREEMENT FORMATION PROCESSOR 311
REFERENCE API 34
DISTRIBUTED LEDGER D1
BLOCKCHAIN D11
REAL D110
EVALUATION D111
STATE INFORMATION D12
REAL D120
EVALUATION D121
2
1
SMART CONTRACT EVALUATION MANAGEMENT NODE 8
SMART CONTRACT EVALUATION MANAGEMENT PART 35
SMART CONTRACT MONITORING PART 36
SMART CONTRACT TRUST D3
SMART CONTRACT EXECUTION NODE 6
SMART CONTRACT EXECUTION PART 32
MEMBER MANAGEMENT NODE 7
MEMBER MANAGEMENT PART 33
PARTICIPATING MEMBER MANAGEMENT INFORMATION D2
PUBLIC KEY D22

FIG. 13