

Claims

1. A method for blockchain-based financial trading, applied to a distributed exchange set up based on a blockchain, the distributed exchange comprising a plurality of trading centers deployed in a distributed manner, the method comprising:

receiving a trade order submitted by a user terminal in communication with a local one of the plurality of trading centers;

transmitting the received trade order to other ones of the plurality of trading centers in the blockchain and receiving trade orders transmitted from the other ones of the plurality of trading centers submitted by user terminals in communication therewith;

generating an order book by performing an order matching process on the received trade orders, transmitting the generated order book to each of the other ones of the plurality of trading centers in the blockchain, and receiving order books transmitted from the other ones of the plurality of trading centers that are generated through performing order matching processes on the corresponding received trade orders, wherein each of the order books comprises a matched order generated by the matching process on corresponding trade orders; and

initiating a consensus process on the order books generated by the plurality of trading centers and executing the matched order in each of the order books for which consensus has been reached.

2. The method of claim 1, comprising calibrating and synchronizing a clock of each of the plurality of trading centers in the distributed exchange in advance.

3. The method of claim 1, comprising, prior to receiving a trade order submitted by a user terminal in communication with a local one of the plurality of trading centers:

pushing transaction quote information to the user terminal in communication with the local one of the plurality of trading centers and recording a time instant of pushing the

transaction quote information.

4. The method of claim 3, wherein the trade order transmitted to the other ones of the plurality of trading centers in the blockchain comprises a propagation delay of the trade order, wherein the propagation delay represents a propagation time of the trade order transmitted from the user terminal to the corresponding trading center in communication therewith.

5. The method of claim 4, wherein the propagation time is a time interval between the time instant of pushing the transaction quote information and a time instant of receiving the trade order.

6. The method of claim 3, wherein receiving a trade order submitted by a user terminal in communication with a local one of the plurality of trading centers comprises:

receiving a trade order submitted by the user terminal in communication with the local one of the plurality of trading centers within a first predetermined period of time after the time instant of pushing, and

wherein receiving trade orders transmitted from the other ones of the plurality of trading centers submitted by user terminals in communication therewith comprises:

determining a transmission time instant of transmitting the received trade order to each of the other ones of the plurality of trading centers in the blockchain; and

receiving trade orders transmitted from the other ones of the plurality of trading centers submitted by user terminals in communication therewith within a second predetermined period of time after the transmission time instant.

7. The method of claim 6, wherein transmitting the generated order book to each of the other ones of the plurality of trading centers in the blockchain comprises:

determining an initial time instant of starting the order matching process on the received trade orders; and

transmitting the order book that is generated within the first predetermined period of time after the initial time instant to each of the other ones of the plurality of trading centers in

the blockchain, and

wherein receiving order books transmitted from the other ones of the plurality of trading centers that are generated through performing order matching processes on the corresponding received trade orders comprises:

determining a transmission time instant of transmitting the generated order book to each of the other ones of the plurality of trading centers in the blockchain; and

receiving the order book that is transmitted from each of the other ones of the plurality of trading centers and generated through performing the order matching process on the corresponding received trade orders within the second predetermined period of time after the transmission time instant.

8. The method of claim 6 or 7, wherein the second predetermined period of time is longer than the first predetermined period of time.

9. The method of claim 3, wherein the trade orders include buy orders and sell orders, and

wherein generating an order book by performing an order matching process on the received trade orders comprises:

matching each of the sell orders to one of the buy orders with a buy price higher than or equal to a sell price of the sell order and with a shortest propagation time to generate the matched order; and

generating the order book based on the matched order.

10. The method of claim 1, wherein initiating a consensus process on the order books generated by the plurality of trading centers comprises:

comparing the generated order book with each of the received order books transmitted from the other ones of the plurality of trading centers to determine the number of identical order books out of the order books generated by the plurality of trading centers;

calculating a ratio of the number of identical order books to the total number of the

plurality of trading centers in the distributed exchange; and

determining whether the ratio reaches a predetermined threshold and, if so, identifying the identical order books out of the order books generated by the plurality of trading centers as an order book for which consensus has been reached.

11. The method of claim 1, further comprising:

returning an execution result of the matched order in the order book for which consensus has been reached to a corresponding user terminal.

12. The method of claim 1, wherein the distributed exchange comprises a plurality of trading centers physically distributed in different regions.

13. An apparatus for blockchain-based financial trading, applied to a distributed exchange set up based on a blockchain, the distributed exchange comprising a plurality of trading centers deployed in a distributed manner, the apparatus comprising:

a reception module configured to receive a trade order submitted by a user terminal in communication with a local one of the plurality of trading centers;

a transmission module configured to transmit the received trade order to other ones of the plurality of trading centers in the blockchain and receive trade orders transmitted from the other ones of the plurality of trading centers submitted by user terminals in communication therewith;

a matching module configured to generate an order book by performing an order matching process on the received trade orders,

the transmission module further configured to transmit the generated order book to each of the other ones of the plurality of trading centers in the blockchain, the reception module further configured to receive order books transmitted from the other ones of the plurality of trading centers that are generated through performing order matching processes on the corresponding received trade orders, wherein each of the order books comprises a matched order generated by the matching process on corresponding trade orders; and

an execution module configured to initiate a consensus process on the order books generated by the plurality of trading centers and execute the matched order in each of the order books for which consensus has been reached.

14. The apparatus of claim 13, comprising calibrating and synchronizing a clock of each of the plurality of trading centers in the distributed exchange in advance.

15. The apparatus of claim 13, wherein the transmission module is further configured to,

prior to receiving a trade order submitted by a user terminal in communication with a local one of the plurality of trading centers, push transaction quote information to the user terminal in communication with the local one of the plurality of trading centers and record a time instant of pushing the transaction quote information.

16. The apparatus of claim 15, wherein the trade order transmitted to the other ones of the plurality of trading centers in the blockchain comprises a propagation delay of the trade order, wherein the propagation delay represents a propagation time of the trade order transmitted from the user terminal to the corresponding trading center in communication therewith.

17. The apparatus of claim 16, wherein the propagation time is a time interval between the time instant of pushing the transaction quote information and a time instant of receiving the trade order.

18. The apparatus of claim 15, wherein the reception module is further configured to receive a trade order submitted by the user terminal in communication with the local one of the plurality of trading centers within a first predetermined period of time after the time instant of pushing, and

wherein the reception module is further configured to:

determine a transmission time instant of transmitting the received trade order to each of the other ones of the plurality of trading centers in the blockchain; and

receive trade orders transmitted from the other ones of the plurality of trading centers submitted by the user terminals in communication therewith within a second predetermined period of time after the transmission time instant.

19. The apparatus of claim 18, wherein the transmission module is further configured to:

determine an initial time instant of starting the order matching process on the received trade orders; and

transmit the order book that is generated within the first predetermined period of time after the initial time instant to each of the other ones of the plurality of trading centers in the blockchain, and

wherein the reception module is further configured to:

determine a transmission time instant of transmitting the generated order book to each of the other ones of the plurality of trading centers in the blockchain;

receive the order book that is transmitted from each of the other ones of the plurality of trading centers and generated through performing the trade order matching process on the corresponding received trade orders within the second predetermined period of time after the transmission time instant.

20. The apparatus of claim 18 or 19, wherein the second predetermined period of time is longer than the first predetermined period of time.

21. The apparatus of claim 13, wherein the trade orders include buy orders and sell orders, and

wherein the matching module is configured to:

match each of the received sell orders to one of the buy orders with buy price higher than or equal to a sell price of the sell order and with a shortest propagation time to generate the matched order; and

generate the order book based on the matched order.

22. The apparatus of claim 13, wherein the execution module is configured to:

compare the generated order book with each of the received order books transmitted from the other ones of the plurality of trading centers to determine the number of identical order books out of the order books generated by the plurality of trading centers;

calculate a ratio of the number of identical order books to the total number of the plurality of trading centers in the distributed exchange; and

determine whether the ratio reaches a predetermined threshold and, if so, identify the identical order books out of the order books generated by the plurality of trading centers as an order book for which consensus has been reached.

23. The apparatus of claim 13, wherein the transmission module is further configured to:

return an execution result of the matched order in the order book for which consensus has been reached to a corresponding user terminal.

24. The apparatus of claim 13, wherein the distributed exchange comprises a plurality of trading centers physically distributed in different regions.

25. An electronic device applied to a distributed exchange set up based on a blockchain, the distributed exchange comprising a plurality of trading centers deployed in a distributed manner, the electronic device comprising:

a processor; and

a storage device for storing machine-executable instructions,

wherein upon reading and executing machine-executable instructions corresponding to a control logic for blockchain-based financial trading that are stored on the storage device, the processor is caused to:

receive a trade order submitted by a user terminal in communication with a local one of the plurality of trading centers;

transmit the received trade order to other ones of the plurality of trading centers in the

blockchain and receive trade orders transmitted from the other ones of the plurality of trading centers submitted by user terminals in communication therewith;

generate an order book by performing an order matching process on the received trade orders, transmit the generated order book to each of the other ones of the plurality of trading centers in the blockchain, and receive order books transmitted from the other ones of the plurality of trading centers that are generated through performing trade order matching processes on the corresponding received trade orders, wherein each of the order books comprises a matched order generated by the matching process on corresponding trade orders; and

initiate a consensus process on the order books generated by the plurality of trading centers and execute the matched order in each of the order books for which consensus has been reached.