## TITLE OF THE INVENTION:

SYSTEM AND METHOD FOR GENERATING LIQUIDITY

## CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** The present application claims the benefit of priority to U.S. Provisional Patent Application number 60/622,019 filed on October 27, 2004, the entire contents of which are hereby incorporated by reference.

## BACKGROUND OF THE INVENTION

### Field of the Invention

**[0002]** The present invention relates generally to trading systems. More particularly, the present invention relates systems and methods of generating liquidity by indicating interests in trading assets. More particularly, according to embodiments of the present invention, a confidential, anonymous matching system and method provides a means for matching indications of interest and executing orders based on the matches, thereby increasing the liquidity of an order execution system.

### Description of the Related Art

**[0003]** Institutions trading large blocks of securities are faced with significant inefficiencies in the markets as a consequence of the markets' focus on retail traders. Such inefficiencies have led to enormous costs in executing institutional trades. Institutional traders cannot share their entire order size information with the markets without causing an adverse impact on the share price.

**[0004]** Recently, some institutions have turned to the use of "indications of interest" (IOIs) to seek out liquidity. Typically a broker receiving a large block from an institutional customer would attempt to find a natural other side to the transaction

to avoid a trade imbalance on the primary exchanges and reduce market impact. Matching systems are known in the prior art for identifying potential counterparties to a transaction. See, e.g., U.S. Patent No. 5,924,082 to Silverman et al. In the Silverman system, traders use subjective criteria, such as a party's credit rating, geographic location, political affiliation, or other subjective criteria, to filter out unacceptable trading parties. The users of the system enter subjective ranking information for all other users, who are identified to each user in a display. A user then enters bid/offer information together with minimum rank information that represents the lowest rank of any potentially acceptable counterparty to the transaction entered by the user. A matching computer then matches bids and offers entered based on the bid/offer parameters and the ranking information. Once potential matches are identified, the matching computer signals the potential counterparties to enable the parties to communicate with each to commence direct negotiations.

**[0005]** The use of such "indications of interest" systems has certain advantages in that it is relatively easy to participate in an indication of interest pool, and traders maintain complete control over their orders. However, the current systems have significant shortcomings, in that 1) information leakage can occur through the negotiation process, which could result in adverse price impact; 2) negotiations frequently can be lengthy and cumbersome, and may not even result in a trade being transacted; 3) the liquidity pool is not diverse; and 4) transactions are limited to two parties.

**[0006]** Thus, there is a need for improved systems and methods for generating liquidity utilizing indications of interest.

## SUMMARY OF THE INVENTION

**[0007]** According to the present invention, systems and methods are provided wherein indications of interest are used to seek out additional liquidity, while full anonymity is preserved and information leakage is avoided.

**[0008]** According to an embodiment of the present invention, unexecuted trading positions may be used as indications of interest, and the corresponding party, trader, etc. may be alerted to the existence of potential indication crosses or matches. The corresponding party, trader, etc. then, for a limited period of time, may convert or "promote" the indication of interest to a "firm" order. The alert maintains anonymity and confidentiality regarding the identity of the trader and the size of the indication of interest. A matching algorithm is then used for share allocation and pricing at which the transactions will occur.

**[0009]** According to an embodiment of the present invention, the system is configured to take non-executable orders or indications of interests, such as an indication to buy or sell an amount of a tradable asset (e.g., a number of shares of a given security), and match indications of interest with a contra trade (i.e., a corresponding indication of interest having the opposing side). As will be described in further detail below, a matching algorithm may be configured to consider multi-party trades (e.g., three-way) and other complex ways of matching indications of interest.

**[0010]** A system for generating liquidity according to an embodiment of the present invention a plurality of client user interfaces and a matching system. Each client user interface includes a trading desktop which stores unexecuted trading positions. The matching system is coupled with the plurality of client user interfaces and configured to receive information about the unexecuted trading positions. The

system can identify as a match one or more first indications of interest which can fulfill one or more second indications of interest, based upon the information about the unexecuted trading positions. For the identified matches, the system can provide a notification of the match and an invitation to execute the match to corresponding client user interfaces. When at least one invitation on each side of the match is accepted, the system forwards orders corresponding to the match, to an order execution system for execution.

**[0011]** According to another embodiment of the present invention, a method for generating liquidity includes the steps of: receiving a plurality of indications of interest to trade an amount of a tradable asset; identifying as a match, one or more first indications of interest from the plurality of indications of interest which can fulfill one or more second indications of interest from the plurality of indications of interest; for the match, providing an invitation to execute the match to each party corresponding to the one or more first indications of interest and one or more second indications of interest; and if at least one invitation on each side of a match is accepted, generating an executable order corresponding to the accepted one or more first indications of interest and the accepted one or more second indications of interest in order to execute a trade of a tradable asset.

**[0012]** According to one embodiment, when an invitation is accepted, an order is generated base on the indication of interest and submitted to the order execution system. However, if, during the window of time for accepting the match, no contra-party orders are accepted, or the order is otherwise not crossed, the order expires and the indication of interest is reset. That is, it reverts back to the client and can be resubmitted as in indication of interest.

**[0013]** Further applications and advantages of various embodiments of the present invention are discussed below with reference to the drawing figures.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0014]** FIG. 1 is a block diagram of a system for creating liquidity according to an embodiment of the present invention.

**[0015]** FIGS. 2a-2i are screen shots of an exemplary interface for a system for creating liquidity according to an embodiment of the present invention.

**[0016]** FIG. 3 illustrates a trading scenario according to an embodiment of the present invention.

**[0017]** FIG. 4 illustrates another trading scenario according to an embodiment of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0018]** While the present invention may be embodied in many different forms, a number of illustrative embodiments are described herein with the understanding that the present disclosure is to be considered as providing examples of the principles of the invention and such examples are not intended to limit the invention to preferred embodiments described herein and/or illustrated herein.

**[0019]** FIG. 1 is a block diagram of a system according to an embodiment of the present invention. The system 100 includes a number of clients 102 which are connected to a trading system 104. Each client 102 can be a trading desktop and comprises appropriate hardware (e.g., PC) and software. The trading desktop may include one or more trading interfaces (for example, TRITON® and CHANNEL™, by ITG Inc.) for entering and monitoring trades for execution, order management system (OMS), and other system that manages target trading positions. Trading

positions are usually stored in a data base and viewed with an interface, usually called a "blotter."

**[0020]** Clients 102 may be connected with the trading system 104 via an electronic data network, direct connection, etc. Trading system 104 may be connected to a number of trading entities, such as exchanges, ECNs, or the like, for receiving trading information, and routing and executing trades. Trading system 104 preferably includes an order execution system 106, which may be a crossing system for executing orders. For example, ITG Inc. owns U.S. Patent 5,873,071. Trading system 104 also preferably includes an order routing system 108 for routing live orders for execution. The system may be connected to a back office system 110 or a ticker tape or other reporting system 112. The system 104 may include appropriate hardware and software for performing encryption, security and connective, such as, for example, proxy servers 114.

**[0021]** The system also includes a matching module 116 for matching indications of interests and converting matches to firm orders as described in more detail below. Indications of interest are preferably kept confidential and anonymous even when a match occurs. The system 104 includes a pricing module (which may be a part of matching module 116) that calculates a price for executing matched indications. Preferably, the pricing module uses a mid-point pricing algorithm.

**[0022]** In order to create a "pool" of indications, the system 100 may be configured to scan each client 102 for uncommitted positions or certain committed yet unexecuted positions (collectively, "indications") that could result in a match against contra-side indications of another client 102 and/or a contra-side order, which may be residing on some other system. This scanning is sometimes called "sweeping." Sweeping may occur at the client 102 or be controlled remotely (e.g., by

matching module 116), depending on the configuration and where blotter data is stored. Alternatively, a means for manually entering indications to the pool could be provided. Once indications are swept, the information can be stored locally and provided to the matching module 116, or stored at the matching module 116, or in a separate memory storage unit (not shown).

**[0023]** According to the invention, "sweeping" can be performed in a number of ways. On some periodic basis, the system can take a slice from a trading desktop blotter and send it to the match pool as an IOI order. Some possible options include:

- Sweep all uncommitted shares. Uncommitted shares are shares not committed to a broker in the OMS.
- Sweep a percentage of the uncommitted shares.
- Sweep all or a percentage of the shares committed to a particular broker.
- Sweep at a fixed rate (e.g., every N seconds, minutes, etc.).

Optionally, a user could be prompted after the sweep to confirm the submission of the indications before sending it to the match pool.

**[0024]** Matching module 116 is configured to access the indications pool and match contra-indications with each other. Once contra-indications are matched, the matching module 116 is configured to notify each party to the match and provide a means for accepting the match. When a match is accepted, the matching module converts the match into executable orders and enters the orders into the order execution system 106. The price of the order is determined by the pricing algorithm (preferable, the mid-point for the asset).

**[0025]** A number of filters or conditions can be utilized for determining when a match exists or when a client 102 is notified of the existence of a match. For

example, whether a client 102 will be alerted to the existence of a possible match can be made dependent upon the potential size of an indication. Take the case of a stock with a 21-day average daily trading value of $1,000,000 or more, the system might be configured to generate an alert for a match only when it has an available position of 25,000 shares or more in that security. For positions in securities with lower 21-day average daily trading values, the position could be limited to those greater than 10,000 for the client 102 to be alerted of a match.

**[0026]** When system detects the possibility of a match for a particular security meeting the applicable alert threshold, the system will send an electronic notification to the affected client 102 informing them that a possible match exists. Preferably, the notification will merely identify the security involved and the side (buy, sell) of the market of the indication. It is usually important to maintain the anonymity of the parties and the confidence of the size and trading constraints of an indication in order to prevent impact on market, gaming, etc. Therefore, it is most preferred that the system will not identify the contra-side parties, the potential size of the transaction, or any other details or trading constraints applicable to the contra-side order or indication.

**[0027]** Once a client 102 receives the notification of a potential match, that client preferably has a set-period (e.g., 45 seconds) to respond to the notification or the match expires. By responding to the notification within this time frame, each of the parties' indications are converted to orders that are submitted to the order execution system 106 for participation in the next match of orders. The indication in the client's trading desktop remains an uncommitted position during this time-window until the client responds to the notification and accepts the match. Until the client accepts the

match, the client remains free to ignore the notification and/or send an order relating to that position elsewhere.

**[0028]** Also, an indication of interest may be matched with an order. In this case, orders could be made "indications eligible," such as by adding a parameter to the order, which would allow the system to consider those orders for its matching indications pool. Order execution system 106 could "push" eligible orders to the matching module 116, or the matching module 116 could sweep indication eligible orders from the order execution system 106, to include those orders in the matching indications pool. One should recognize that the price of such indications eligible orders should be considered during matching in order to avoid generating false matches.

**[0029]** If a client does not respond to the electronic notification within the response time-window, it will be notified that a potential match opportunity was missed. The client may subsequently elect to reactivate the indication. As an option, the position can be excluded from consideration for future matching opportunities within the system until it is reactivated.

**[0030]** At the time of converting an indication into an order for submission to the order execution system 106 (i.e., responding within the notification window), the client may elect to specify a period of time (time-in-force) in which any uncrossed portion of that order will remain in execution system 106 as an order, during which time it can potentially interact with other orders. If the order has not been completely filled, the unfilled portion is returned to matching module 116 or to the client user 102, where it may revert to an indication of interest.

**[0031]** Synchronization between order execution systems and the conversion process may be required in order to ensure that the converted indication is crossed.

In such cases, when a client is notified of a trading opportunity (alert) for a particular security (with the contra side being another client or an Indication-eligible order), crossing in that security in order execution system 106 can be suspended until the earlier of the following: (a) all clients receiving alerts have responded by sending accepting matches, or (b) the alert response window has expired. This mechanism permits a client user, if it responds to the notification within the allotted time, to participate in a match against any order in the order management system 106 on the contra side of the market without fear that the contra side order(s) would become unavailable through a cross with an existing or intervening order on the same side of the market as the user.

**[0032]** All orders matched within the order execution system 106 are executed at a price between the national best bid and offer at the time of the match (e.g., mid-point), thereby providing price improvement for all contra-parties involved in the match. The exact execution price for orders matched within the system and, correspondingly, the amount of price improvement received by a party to a match, can depend on various factors.

**[0033]** It should be understood that FIG. 1 is not meant to be a limiting configuration and the features and components thereof may vary. For example, matching can be performed at each client 102 and matches could be directly entered into the order execution system from the participating clients. It will also be understood that the components of FIG. 1 can be implemented with appropriate computer hardware and software to support the functionality and connectivity of the system and method of the present invention. Preferably, state of the art computer hardware and programming technique will be used to implement the present invention. Further, any computer architecture may be used. That is, functions may

be centralized, object oriented, or distributed, and it is not intended that each logical component must be implemented as separate equipment.

**[0034]** FIGS. 2a-2i are screen shots of an exemplary client user interface (e.g., graphical user interface (GUI)). By way of example, a system and method according to an embodiment of the present invention will be described with reference to the screen shots. The example of Figs. 2a-2e are screen shots of a client user interface made and marketed by ITG Inc. POSIT Alert is a trademark owned by ITG Inc. Further, it should be understood that actions within the client interface are described with reference to the client interface, but processing can be performed as described with reference to FIG. 1 above. Typical GUI navigation techniques are assumed to be understood.

**[0035]** FIG. 2a shows a GUI 200, which includes tabs for accessing an OMS screen blotter 202, active orders 204, reports 206, and indication system 208. A lower block 210 includes the detail information for each tab (here, the OMS blotter tab is active). In the lower block 210 displaying the blotter information, a number of uncommitted trades or indications are shown. Each indication includes the names of the equities 214 along with side 216, size available 218, order size 220, limit price (type of order) 222, and destination of order 224. Also shown, is an "include" check box 212, which allows the user to have the orders on the blotter to "indicate out." A sweeping routine pulls the data regarding each order that has the include check-box 212 checked.

**[0036]** FIG. 2b shows the indication system tab 208 highlighted, and the detailed information in block 210 includes the recently swept information. However, this user is not participating yet and the swept indications are striked-through, meaning that

they are not currently indicating out to the system. If participation button 211a is depressed, then the system will indicate out.

**[0037]** FIG. 2c shows that participation is now on. There is an alert indicator 226 which notifies the user whether a match exists. Note that no other details are given except that a match exists. What this means is that one or more parties can fulfill an order having the parameters of the indications of interest. For example, this user has indicated of interest to buying 50,000 shares of MSFT, 90,000 shares of T, and 35,000 shares of PFE. A match indication 226 means that one or more parties have indications that would complete the orders - - indications of interest to sell 50,000 shares of MSFT, 90,000 shares of T and 35,000 shares of PFE. No order is executed here without at least one party on each side making the choice to execute. The number of matches "[3]" is shown in an "alert" button 219.

**[0038]** In FIG. 2d, the user is notified of the matches by a pop-up 236. In FIG. 2e, a window 238 shows each match 231, 232, and 234 and the time remaining bars 231a, 232a, and 234a before each match expires and cannot be accepted. As described above, a means for accepting the match and converting the indication of interest into an executable order is provided. In this example, as shown in FIG. 2f, by clicking onto the match (231, 232 or 234), a pop-up window 240 is generated that includes the details of a proposed order. Note here, the order is for less than the entire amount, meaning that the contra-indication is for only 25,000 shares. Optionally, only entire indications could be matched (i.e., only 50,000 shares of MSFT). Also, any amount of data could be shown in pop-up 240 or no data could be shown. Pop-up 240 includes a "send" button 242 that allows the user to accept the match. If the contra-party(s) also accepts the match, the match then is converted to an order and executed.

**[0039]** Referring to FIG. 2g, an order screen 204 is shown after the MSFT indication match was accepted. Note that the last order 228 is a filled order for buying 25,000 shares of MSFT generated from an indication of interest. Now only two matches 232 and 234 remain in pop-up window 230.

**[0040]** If an match indication (invitation) times out, then the match is terminated (FIG. 2h) and the indication resets (FIG. 2i). In FIG. 2h, the indication 244 for T is stricken when T times out. The match T is shown as expired in a button 245 in pop-up window 230. On the next sweep, as shown in FIG. 2i, T is reinitiated as indicating out.

**[0041]** One skilled in the art will readily understand that the GUI shown in FIGS. 2a-2i is merely exemplary and many other GUI's are contemplated. Further, the functions of the GUI could be changed or implemented with different features. One skilled in the art will understand that the GUI could be implemented with many different types of software or programs, such as with VISUAL BASIC or ORACLE FORMS.

**[0042]** Referring to FIG. 3, a first trading scenario shows one example of the present invention, wherein a buy indication for 100,000 shares of a certain security is entered into the system at 10:15. At 10:22, a sell indication for 40,000 shares of the security is entered. At this time, the potential buyer and potential seller are each alerted to the existence of a potential cross or match. At 10:23, the buyer converts or promotes the indication to an actual order to buy 100,000 shares, and the seller converts or promotes the indication to an actual order to sell 40,000 shares. At 10:24, the system crosses the 40,000 shares of available liquidity at a price that is the mid-point between the current market bid-and-ask prices for the security at issue.

Subsequently, the residual amount of 60,000 shares is reverted to an indication of interest only.

**[0043]** Referring to FIG. 4, a second trading scenario shows another example of the present invention, wherein prior to the indication of interest entries, two independent traders have each entered an order on a conventional crossing system to sell a collective total of 50,000 shares. Under this scenario, the traders may choose to participate in the indication of interest pool in the event that a potential cross comes into existence. When the buy indication and sell indication as in Scenario 1 are promoted to actual orders, the preexisting sell orders are allowed to participate in the cross. As a result, a total of 90,000 shares are matched at the mid-point price, with the residual 10,000 shares being reverted to an indication of interest.

**[0044]** Thus, a number of preferred embodiments have been fully described above with reference to the drawing figures. Although the invention has been described based upon these preferred embodiments, it would be apparent to those of skill in the art that certain modifications, variations, and alternative constructions could be made to the described embodiments within the spirit and scope of the invention.

**[0045]** For example, users could be classified by, for example, user profiles, and matching could be limited to users having a specified user profile.

**THE CLAIMS:**

We claim:

1. A system for generating liquidity, comprising:

a plurality of client user interfaces, each said client user interface including a trading desktop having a means for storing unexecuted trading positions to trade a given amount of a tradable asset;

a matching system coupled with said plurality of client user interfaces and configured to receive from said plurality of user client interfaces a plurality of unexecuted trading positions, to identify as a match one or more first unexecuted trading positions from said plurality of unexecuted trading positions which can fulfill one or more second unexecuted trading positions from said plurality of unexecuted trading positions, and, for the identified matches, to provide a notification of said match and an invitation to execute said match to corresponding client user interfaces, and, when each said invitation is accepted, to forward orders corresponding to the match, to an order execution system for execution.

2. The system as recited in claim 1, wherein said matching system includes a pricing module for determining a price at which to execute orders corresponding to the unexecuted trading positions for a match.

3. The system as recited in claim 2, wherein said pricing module calculates a mid-point of a current highest and lowest offer price for the asset for the match.

4. The system as recited in claim 1, wherein at least one client user interface is configured to submit unexecuted trading positions to said matching system.

5. The system as recited in claim 1, wherein said invitation to execute expires within a predetermined period of time and includes an indication of said predetermined period of time.

6. The system as recited in claim 1, wherein each said client user interface includes a graphical user interface for displaying said unexecuted trading positions and said invitation to execute a match.

7. The system as recited in claim 6, wherein unexecuted trading positions are anonymous and confidential within said system.

8. The system as recited in claim 1, wherein each unexecuted trading position includes at least one of size of a trade, an asset name of an asset to be traded, and the side of the trade.

9. The system as recited in claim 1, wherein said matching system has access to unexecuted orders and a match can include one or more unexecuted orders.

10. The system as recited in claim 6, wherein said invitation to execute expires within a predetermined period of time and said graphical user interface includes a dynamic display of said predetermined period of time and an elapsing of said predetermined period of time to indicate an amount of time left to accept said invitation before expiration of said invitation.

11. A method for generating liquidity, comprising the steps of:

receiving a plurality of indications of interest to trade an amount of a tradable asset;

identifying as a match, one or more first indications of interest from said plurality of indications of interest which can fulfill one or more second indications of interest from said plurality of indications of interest;

for said match, providing an invitation to execute said match to each party corresponding to the one or more first indications of interest and one or more second indications of interest; and

when an invitation is accepted, generating an executable order corresponding to the accepted one or more first indications of interest or the accepted one or more second indications of interest in order to execute a trade of a tradable asset.

12. The method as recited in claim 11, wherein said step of receiving includes a step of accessing a plurality of trading desktops and reading unexecuted trading positions stored on each of said plurality of trading desktops, said indications of interest being based upon said unexecuted trading positions.

13. The method as recited in claim 11, further including a step of calculating a price at which to execute said trade of said asset.

14. The method as recited in claim 13, wherein said step of calculating calculates a mid-point of a current highest and lowest offer price for the asset for the match.

15. The method as recited in claim 11, wherein said invitation to execute expires within a predetermined period of time and includes an indication of said predetermined period of time.

16. The method as recited in claim 11, including a step of displaying said indications of interest and said invitations to execute a match to the corresponding parties via a client user interface.

17. The method as recited in claim 16, wherein indications of interest are always anonymous and confidential.

18. The method as recited in claim 16, wherein each indication of interest includes the size of a trade, an asset name of an asset to be traded, and the side of the trade.

19. The method as recited in claim 16, wherein said indications of interest can be based on executable or nonexecutable orders.

20. The method as recited in claim 16, wherein said invitation to execute expires within a predetermined period of time and said graphical user interface includes a dynamic display of said predetermined period of time and an elapsing of said predetermined period of time to indicate an amount of time left to accept said invitation before expiration of said invitation.

21. A computer implemented system for creating liquidity in a market by confidentially and anonymously matching unexecuted positions in a market, comprising:

a sweeping program for reading a plurality of trade blotters to receive data representing unexecuted positions in a market, the data for each unexecuted position including a security name, a size and a side;

a matching program for receiving said data from said sweeping program and identifying a first and second unexecuted position which form a match by having a same security name, a same size and opposite sides, and outputting executable orders representing the first or second unexecuted position to an order execution system for execution.

22. The computer implemented system as reciting in claim 21, wherein said matching program is capable of creating a single match from three or more unexecuted positions, wherein said match includes at least one unexecuted position on each side of the match.

23. The computer implemented system as recite in claim 21, wherein said matching program is capable of accessing said order execution system and receive data relating to unexecuted orders, and is capable of creating matches from unexecuted positions and from unexecuted orders.

24. The computer implemented system as reciting in claim 21, wherein said matching program is capable of outputting match data to one or more trading desktops corresponding to the first and second unexecuted positions when a match

occurs, and only outputs executable orders for the match when said matching program receives instructions to generate an order based on the match.

25. The computer implemented system as reciting in claim 24, wherein said matching program only outputs executable orders for the match when said matching program receives instructions to generate an order based on the match within a preset period of time.

26. The computer implemented system as recited in claim 22, wherein said matching program is capable of creating one or more matches from three or more unexecuted positions, wherein said match or matches includes at least one unexecuted position on each side of the match only if a minimum size constraint is met.

27. The system as recited in claim 1, wherein each said client interface is configured to create a filter definition, and said matching system can only receive unexecuted trading positions which satisfy said filter definition.