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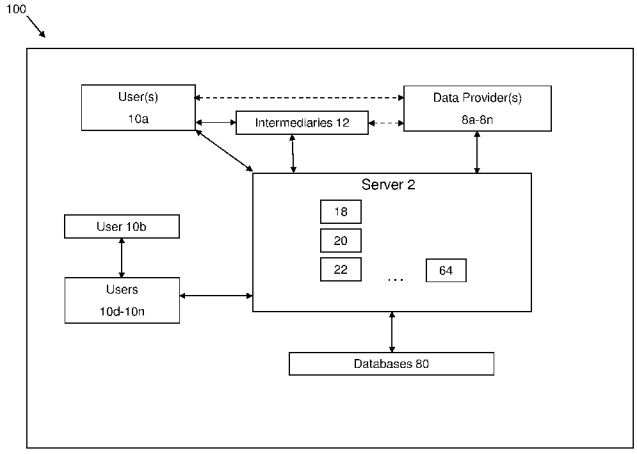
(54) Title: METHODS, APPARATUS, AND SYSTEMS FOR FIRST LOOK MATCHING OF ORDERS

FIG. 1



(57) Abstract: Various embodiments are directed to a trading system and method for matching orders between liquidity takers and liquidity providers. A memory stores instructions which, when executed, direct the processor to perform various actions, such as the following. The processor may receive from a liquidity taker, an order to trade on an exchange. The order is routed to at least one liquidity provider with a target fill rate above a specific percentage. A response is received from the at least one liquidity provider. Based on the received response, the processor may update an actual fill rate of the at least one liquidity provider. The processor may determine, based on comparing the liquidity provider's actual fill rate with the target fill rate, a level of performance for the at least one liquidity provider. The processor may transmit a report about the at least one liquidity provider's level of performance.

METHODS, APPARATUS AND SYSTEMS FOR FIRST LOOK MATCHING OF ORDERS

Cross Reference to Related Applications

[0001] This application claims priority to U.S. Patent Application Serial No. 14/074,126 filed on November 7, 2013, which is hereby incorporated by reference herein.

Background

[0002] Trading parties typically submit trading orders for a security a prices and quantities they are willing to trade. The parties submitting orders are generally referred to as "liquidity takers", and the parties that are able to execute the order are generally referred to as "liquidity providers." In certain markets, such as foreign exchange, trades are traditionally executed by "second look." Under second look, a liquidity taker submits an order that is routed to a liquidity provider. The liquidity provider has a period of time to decide whether to accept the order (e.g., respond with "done") or deny the order (e.g. respond with "no or fail to respond). This period of time to decide often leads to uncertainty for the liquidity taker, especially where a large quantity of money is tied to the submitted order.

Brief Summary

[0003] Various embodiments are directed to matching orders between liquidity takers and liquidity providers based on a "first look" process. In some embodiments, orders from liquidity takers are immediately matched with liquidity providers having a target fill rate above a certain percentage.

Brief Description of the Figures

[0004] FIG. 1 depicts a system according to at least one embodiments of the methods disclosed herein.

[0005] FIG. 2 depicts a flow diagram according to ate least one embodiment of the methods disclosed herein.

[0006] FIG. 3 depicts a flow diagram according to ate least one embodiment of the methods disclosed herein.

[0007] FIG. 4 depicts a flow diagram according to ate least one embodiment of the methods disclosed herein.

Detailed Description

[0008] The following sections I - XI provide a guide to interpreting the present application.

1. Terms

[0009] The term "product" means a machine, manufacture and/or composition of matter, unless expressly specified otherwise. The term "process" means a process, algorithm, method or the like, unless expressly specified otherwise.

[0010] Each process (whether called a method, algorithm or otherwise) inherently includes one or more steps, and therefore all references to a "step" or "steps" of a process have an inherent antecedent basis in the mere description of a process, or in the mere recitation of the term 'process' or a like term. Accordingly, any reference in a claim to a 'step' or 'steps' of a process has sufficient antecedent basis.

[0011] The term "invention" and the like mean "the one or more inventions disclosed in this application", unless expressly specified otherwise.

[0012] The terms "an embodiment", "embodiment", "embodiments", "the embodiment", "the embodiments", "one or more embodiments", "some embodiments", "certain embodiments", "one embodiment", "another embodiment" and the like mean "one or more (but not all) embodiments of the invention", unless expressly specified otherwise.

[0013] The term "variation" of an invention means an embodiment of the invention, unless expressly specified otherwise.

[0014] The term "indication" is used in an extremely broad sense. An "indication" of a thing should be understood to include anything that may be used to determine the thing.

[0015] An indication of a thing may include an electronic message that identifies the thing (e.g., an identification of a widget by a serial number affixed to the widget, an identification of a widget by one or more characteristics of the widget). An indication of a thing

may include information that may be used to compute and/or look-up a thing (e.g., information identifying a machine of which a widget is a part that may be used to determine the widget). An indication of a thing may specify things that are related to the thing (e.g., characteristics of the thing, a name of the thing, a name of a thing related to the thing). An indication of a thing may not specify things that are related to the thing (e.g., a letter "a" may be an indication of a widget of a computer system that is configured to interpret the letter "a" to identify the widget). An indication of a thing may include a sign, a symptom, and/or a token of the thing. An indication, for example, may include a code, a reference, an example, a link, a signal, and/or an identifier. An indication of a thing may include information that represents, describes, and/or otherwise is associated with the thing.

[0016] A transformation of an indication of a thing may be an indication of the thing (e.g., an encrypted indication of a thing may be an indication of the thing). An indication of a thing may include the thing itself, a copy of the thing, and/or a portion of the thing. An indication of a thing may be meaningless to a thing that is not configured to understand the indication (e.g., a person may not understand that a letter "a" indicates a widget but it may nonetheless be an indication of the widget because the computer system may determine the widget from the letter "a"). It should be understood that the fact that an indication of a thing may be used to determine the thing does not mean that the thing or anything else is determined. An indication of a thing may include an indication of any number of the thing unless specified otherwise. An indication of a thing may include an indication of other things (e.g., an electronic message that indicates may things). (Indication can be used as a very broad term in claim language. For example: receiving an indication of a financial instrument.)

[0017] The term "represent" means (1) to serve to express, designate, stand for, or denote, as a word, symbol, or the like does; (2) to express or designate by some term, character, symbol, or the like; (3) to portray or depict or present the likeness of, as a picture does; or (4) to serve as a sign or symbol of.

[0018] A reference to "another embodiment" in describing an embodiment does not imply that the referenced embodiment is mutually exclusive with another embodiment (e.g., an embodiment described before the referenced embodiment), unless expressly specified otherwise. Similarly, the mere fact that two (or more) embodiments are referenced does not imply that those embodiments are mutually exclusive.

[0019] One embodiment of the invention may include or cover or embrace more than one other embodiment of the invention. For example, a first embodiment comprising elements a, b, and c may cover a second embodiment that comprises elements a, b, c, and d as well as a third embodiment covering elements a, b, c, and e. Similarly, each of the first, second, and third embodiments may cover a fourth embodiment comprising elements a, b, c, d, and e.

[0020] The terms "including", "comprising" and variations thereof mean "including but not necessarily limited to", unless expressly specified otherwise. Thus, for example, the sentence "the machine includes a red widget and a blue widget" means the machine includes the red widget and the blue widget, but may possibly include one or more other items as well.

[0021] The term "consisting of" and variations thereof mean "including and also limited to", unless expressly specified otherwise. Thus, for example, the sentence "the machine consists of a red widget and a blue widget" means the machine includes the red widget and the blue widget, but does not include anything else.

[0022] The term "compose" and variations thereof mean "to make up the constituent parts of, component of or member of", unless expressly specified otherwise. Thus, for example, the sentence "the red widget and the blue widget compose a machine" means the machine includes the red widget and the blue widget.

[0023] The term "exclusively compose" and variations thereof mean "to make up exclusively the constituent parts of, to be the only components of, or to be the only members of", unless expressly specified otherwise. Thus, for example, the sentence "the red widget and the blue widget exclusively compose a machine" means the machine consists of the red widget and the blue widget (i.e. and nothing else).

[0024] The terms "a", "an" and "the" refer to "one or more", unless expressly specified otherwise. Thus, for example, the phrase "a widget" means one or more widgets, unless expressly specified otherwise. Similarly, after reciting the phrase "a widget", a subsequent recitation of the phrase "the widget" means "the one or more widgets". Accordingly, it should be understood that the word "the" may also refer to a specific term having antecedent basis. For example, if a paragraph mentions "a specific single feature" and then refers to "the feature," then the phrase "the feature" should be understood to refer to the previously mentioned "a specific

single feature." (It should be understood that the term "a" in "a specific single feature" refers to "one" specific single feature and not "one or more" specific single features.)

[0025] The term "plurality" means "two or more", unless expressly specified otherwise.

[0026] The term "herein" means "in the present application, including anything which may be incorporated by reference", unless expressly specified otherwise.

[0027] The phrase "at least one of", when such phrase modifies a plurality of things (such as an enumerated list of things), means any combination of one or more of those things, unless expressly specified otherwise. For example, the phrase "at least one of a widget, a car and a wheel" means either (i) a widget, (ii) a car, (iii) a wheel, (iv) a widget and a car, (v) a widget and a wheel, (vi) a car and a wheel, or (vii) a widget, a car and a wheel. The phrase "at least one of", when such phrase modifies a plurality of things does not mean "one of each of" the plurality of things. For example, the phrase "at least one of a widget, a car and a wheel" does not mean "one widget, one car and one wheel".

[0028] Numerical terms such as "one ", "two ", etc. when used as cardinal numbers to indicate quantity of something (e.g., one widget, two widgets), mean the quantity indicated by that numerical term, but do not mean at least the quantity indicated by that numerical term. For example, the phrase "one widget" does not mean "at least one widget", and therefore the phrase "one widget" does not cover, e.g., two widgets.

[0029] The phrase "based on" does not mean "based only on", unless expressly specified otherwise. In other words, the phrase "based on" covers both "based only on" and "based at least on". The phrase "based at least on" is equivalent to the phrase "based at least in part on". For example, the phrase "element A is calculated based on element B and element C" covers embodiments where element A is calculated as the product of B times C (in other words, A = B x C), embodiments where A is calculated as the sum of B plus C (in other words, A = B + C), embodiments where A is calculated as a product of B times C times D, embodiments where A is calculated as a sum of the square root of B plus C plus D times E, and so on.

[0030] The terms "represent" and like terms are not exclusive, unless expressly specified otherwise. For example, the term "represents" does not mean "represents only", unless expressly specified otherwise. For example, the phrase "the data represents a credit card

number" covers both "the data represents only a credit card number" and "the data represents a credit card number and the data also represents something else".

[0031] The term "whereby" is used herein only to precede a clause or other set of words that express only the intended result, objective or consequence of something that is explicitly recited before the term "whereby". Thus, when the term "whereby" is used in a claim, the clause or other words that the term "whereby" modifies do not establish specific further limitations of the claim or otherwise restrict the meaning or scope of the claim.

[0032] The terms "e.g ", "such as" and like terms mean "for example", and thus do not limit the term or phrase they explain. For example, in the sentence "the computer sends data (e.g., instructions, a data structure) over the Internet", the term "e.g." explains that "instructions" are an example of "data" that the computer may send over the Internet, and also explains that "a data structure" is an example of "data" that the computer may send over the Internet. However, both "instructions" and "a data structure" are merely examples of "data", and other things besides "instructions" and "a data structure" can be "data".

[0033] The term "respective" and like terms mean "taken individually". Thus if two or more things have "respective" characteristics, then each such thing has its own characteristic, and these characteristics can be different from each other but need not be. For example, the phrase "each of two machines has a respective function" means that the first of the two machines has a function and the second of the two machines has a function as well. The function of the first machine may or may not be the same as the function of the second machine.

[0034] The term "i.e." and like terms mean "that is", and thus limits the term or phrase it explains. For example, in the sentence "the computer sends data (i.e., instructions) over the Internet", the term "i.e." explains that "instructions" are the "data" that the computer sends over the Internet

[0035] A numerical range includes integers and non-integers in the range, unless expressly specified otherwise. For example, the range "1 to 10" includes the integers from 1 to 10 (e.g., 1, 2, 3, 4, … 9, 10) and non-integers (e.g., 1.0031415926, 1.1, 1.2, … 1.9).

[0036] Where two or more terms or phrases are synonymous (e.g., because of an explicit statement that the terms or phrases are synonymous), instances of one such term or phrase does not mean instances of another such term or phrase must have a different meaning. For example,

where a statement renders the meaning of "including" to be synonymous with "including but not limited to", the mere usage of the phrase "including but not limited to" does not mean that the term "including" means something other than "including but not limited to".

2. Determining

[0037] The term "determining" and grammatical variants thereof (e.g., to determine a price, determining a value, the determination of an object which meets a certain criterion) is used in an extremely broad sense. The term "determining" encompasses a wide variety of actions and therefore "determining" can include calculating, computing, processing, deriving, investigating, looking up (e.g., looking up in a table, a database or another data structure), rendering into electronic format or digital representation, ascertaining and the like. Also, "determining" can include receiving (e.g., receiving information), accessing (e.g., accessing data in a memory) and the like. Also, "determining" can include resolving, selecting, choosing, establishing, and the like.

[0038] The term "determining" does not imply certainty or absolute precision, and therefore "determining" can include estimating, extrapolating, predicting, guessing, averaging and the like.

[0039] The term "determining" does not imply that mathematical processing must be performed, and does not imply that numerical methods must be used, and does not imply that an algorithm is used.

[0040] The term "determining" does not imply that any particular device must be used. For example, a computer need not necessarily perform the determining.

[0041] The term "determining" may include "calculating". The term "calculating" should be understood to include performing one or more calculations. Calculating may include computing, processing, and/or deriving. Calculating may be performed by a computing device. For example, calculating a thing may include applying an algorithm to data by a computer processor and generating the thing as an output of the processor.

[0042] The term "determining" may include "referencing". The term "referencing" should be understood to include making one or more reference, e.g., to a thing. Referencing may include querying, accessing, selecting, choosing, reading, and/or looking-up. The act of

referencing may be performed by a computing device. For example, referencing a thing may include reading a memory location in which the thing is stored by a processor.

[0043] The term "determining" may include "receiving". For example, receiving a thing may include taking in the thing. In some embodiments, receiving may include acts performed to take in a thing, such as operating a network interface through which the thing is taken in. In some embodiments, receiving may be performed without acts performed to take in the thing, such as in a direct memory write or a hard wired circuit. Receiving a thing may include receiving a thing from a remote source that may have calculated the thing.

3. Forms of Sentences

[0044] Where a limitation of a first claim would cover one of a feature as well as more than one of a feature (e.g., a limitation such as "at least one widget" covers one widget as well as more than one widget), and where in a second claim that depends on the first claim, the second claim uses a definite article "the" to refer to that limitation (e.g., "the widget"), this mere usage does not imply that the first claim covers only one of the feature, and this does not imply that the second claim covers only one of the feature (e.g., "the widget" can cover both one widget and more than one widget).

[0045] When an ordinal number (such as "first", "second", "third" and so on) is used as an adjective before a term, that ordinal number is used (unless expressly specified otherwise) merely to indicate a particular feature, such as to distinguish that particular feature from another feature that is described by the same term or by a similar term, but that ordinal number does not have any other meaning or limiting effect – it is merely a convenient name. For example, a "first widget" may be so named merely to distinguish it from, e.g., a "second widget". Thus, the mere usage of the ordinal numbers "first" and "second" before the term "widget" does not indicate any other relationship between the two widgets, and likewise does not indicate any other characteristics of either or both widgets. For example, the mere usage of the ordinal numbers "first" and "second" before the term "widget" (1) does not indicate that either widget comes before or after any other in order or location; (2) does not indicate that either widget occurs or acts before or after any other in time; and (3) does not indicate that either widget ranks above or below any other, as in importance or quality. The mere usage of ordinal numbers does not define a numerical limit to the features identified with the ordinal numbers. For example, the mere usage of the ordinal numbers "first" and "second" before the term "widget" does not indicate that there are exactly two widgets.

[0046] When a single device, article or other product is described herein, in another embodiment more than one device or article (whether or not they cooperate) may alternatively be used in place of the single device or article that is described. Accordingly, the functionality that is described as being possessed by a device may alternatively be possessed by more than one device or article (whether or not they cooperate) in another embodiment.

[0047] Similarly, where more than one device, article or other product is described herein (whether or not they cooperate), in another embodiment a single device or article may alternatively be used in place of the more than one device or article that is described. For example, a plurality of computer-based devices may be substituted with a single computer-based device. In some embodiments, such a plurality of computer-based devices may operate together to perform one step of a process such as is common in grid computing systems. In some embodiments, such a plurality of computer-based devices may operate provide added functionality to one another so that the plurality may operate to perform one step of a process such as is common in cloud computing systems. (Conversely, a single computer-based device may be substituted with multiple computer-based devices operating in cooperation with one another. For example, a single computing device may be substituted with a server and a workstation in communication with one another over the internet) Accordingly, the various functionality that is described as being possessed by more than one device or article may alternatively be possessed by a single device or article.

[0048] The functionality and/or the features of a single device that is described may, in another embodiment, be alternatively embodied by one or more other devices which are described but are not explicitly described as having such functionality or features. Thus, other embodiments need not include the described device itself, but rather can include the one or more other devices which would, in those other embodiments, have such functionality or features.

4. Disclosed Examples and Terminology Are Not Limiting

[0049] Neither the Title (set forth at the beginning of the first page of the present application) nor the Abstract (set forth at the end of the present application) is to be taken as limiting in any way the scope of the disclosed invention, is to be used in interpreting the meaning of any claim or is to be used in limiting the scope of any claim. An Abstract has been included in this application merely because an Abstract is required under 37 C.F.R. § 1.72(b).

[0050] The headings of sections provided in the present application are for convenience only, and are not to be taken as limiting the disclosure in any way.

[0051] Numerous embodiments are described in the present application, and are presented for illustrative purposes only. The described embodiments are not, and are not intended to be, limiting in any sense. The disclosed invention is widely applicable to numerous embodiments, as is readily apparent from the disclosure. One of ordinary skill in the art will recognize that the disclosed invention may be practiced with various modifications and alterations, such as structural, logical, software, and electrical modifications. Although particular features of the disclosed invention may be described with reference to one or more particular embodiments and/or drawings, it should be understood that such features are not limited to usage in the one or more particular embodiments or drawings with reference to which they are described, unless expressly specified otherwise.

[0052] Though an embodiment may be disclosed as including several features, other embodiments of the invention may include fewer than all such features. Thus, for example, a claim may be directed to less than the entire set of features in a disclosed embodiment, and such claim would not be interpreted as requiring features beyond those features that the claim expressly recites.

[0053] No embodiment of method steps or product elements described in the present application constitutes the invention claimed herein, or is essential to the invention claimed herein, or is coextensive with the invention claimed herein, except where it is either expressly stated to be so in this specification or (with respect to a claim 1nd the invention defined by that claim) expressly recited in that claim.

[0054] Any preambles of the claims that recite anything other than a statutory class shall be interpreted to recite purposes, benefits and possible uses of the claimed invention, and such preambles shall not be construed to limit the claimed invention.

[0055] The present disclosure is not a literal description of all embodiments of the invention. Also, the present disclosure is not a listing of features of the invention which must be present in all embodiments.

[0056] All disclosed embodiments are not necessarily covered by the claims (even including all pending, amended, issued and canceled claims). In addition, a disclosed embodiment may be (but need not necessarily be) covered by several claims. Accordingly, where a claim (regardless of whether pending, amended, issued or canceled) is directed to a particular embodiment, such is not evidence that the scope of other claims do not also cover that embodiment.

[0057] Devices that are described as in communication with each other need not be in continuous communication with each other, unless expressly specified otherwise. On the contrary, such devices need only transmit to each other as necessary or desirable, and may actually refrain from exchanging data most of the time. For example, a machine in communication with another machine via the Internet may not transmit data to the other machine for long period of time (e.g. weeks at a time). In addition, devices that are in communication with each other may communicate directly or indirectly through one or more intermediaries. Devices are in communication with one another if they are capable of at least one-way communication with one another. For example, a first device is in communication with a second device if the first device is capable of transmitting information to the second device. Similarly, the second device is in communication with the first device if the second device is capable of receiving information from the first device.

[0058] A description of an embodiment with several components or features does not imply that all or even any of such components or features are required. On the contrary, a variety of optional components are described to illustrate the wide variety of possible embodiments of the present invention. Unless otherwise specified explicitly, no component or feature is essential or required.

[0059] Although process steps, algorithms or the like may be described or claimed in a particular sequential order, such processes may be configured to work in different orders. In other words, any sequence or order of steps that may be explicitly described or claimed does not necessarily indicate a requirement that the steps be performed in that order. The steps of processes described herein may be performed in any order possible. Further, some steps may be performed simultaneously despite being described or implied as occurring non-simultaneously (e.g., because one step is described after the other step). Moreover, the illustration of a process by its depiction in a drawing does not imply that the illustrated process is exclusive of other

variations and modifications thereto, does not imply that the illustrated process or any of its steps are necessary to the invention, and does not imply that the illustrated process is preferred.

[0060] Although a process may be described as including a plurality of steps, that does not imply that all or any of the steps are preferred, essential or required. Various other embodiments within the scope of the described invention include other processes that omit some or all of the described steps. Unless otherwise specified explicitly, no step is essential or required.

[0061] Although a process may be described singly or without reference to other products or methods, in an embodiment the process may interact with other products or methods. For example, such interaction may include linking one business model to another business model. Such interaction may be provided to enhance the flexibility or desirability of the process.

[0062] Although a product may be described as including a plurality of components, aspects, qualities, characteristics and/or features, that does not indicate that any or all of the plurality are preferred, essential or required. Various other embodiments within the scope of the described invention include other products that omit some or all of the described plurality.

[0063] An enumerated list of items (which may or may not be numbered) does not imply that any or all of the items are mutually exclusive, unless expressly specified otherwise. Likewise, an enumerated list of items (which may or may not be numbered) does not imply that any or all of the items are comprehensive of any category, unless expressly specified otherwise. For example, the enumerated list “a computer, a laptop, and a PDA” does not imply that any or all of the three items of that list are mutually exclusive and does not imply that any or all of the three items of that list are comprehensive of any category.

[0064] An enumerated list of items (which may or may not be numbered) does not imply that any or all of the items are equivalent to each other or readily substituted for each other.

[0065] All embodiments are illustrative, and do not imply that the invention or any embodiments were made or performed, as the case may be.

5. Computing

[0066] It will be readily apparent to one of ordinary skill in the art that the various processes described herein may be implemented by, e.g., appropriately programmed general purpose computers, special purpose computers and computing devices. Typically a processor (e.g., one or more microprocessors, one or more microcontrollers, one or more digital signal processors) will receive instructions (e.g., from a memory or like device), and execute those instructions, thereby performing one or more processes defined by those instructions. Instructions may be embodied in, e.g., one or more computer programs, one or more scripts.

[0067] The term "compute" shall mean to determine using a processor in accordance with a software algorithm.

[0068] A "processor" means one or more microprocessors, central processing units (CPUs), computing devices, microcontrollers, digital signal processors, graphics processing units (GPUs) or like devices or any combination thereof, regardless of the architecture (e.g., chip-level multiprocessing or multi-core, RISC, CISC, Microprocessor without Interlocked Pipeline Stages, pipelining configuration, simultaneous multithreading, microprocessor with integrated graphics processing unit, GPGPU).

[0069] A "computing device" means one or more microprocessors, central processing units (CPUs), computing devices, microcontrollers, digital signal processors, graphics card, mobile gaming device, or like devices or any combination thereof, regardless of the architecture (e.g., chip-level multiprocessing or multi-core, RISC, CISC, Microprocessor without Interlocked Pipeline Stages, pipelining configuration, simultaneous multithreading).

[0070] Thus a description of a process is likewise a description of an apparatus for performing the process. The apparatus that performs the process can include, e.g., a processor and those input devices and output devices that are appropriate to perform the process. For example, a description of a process is a description of an apparatus comprising a processor and memory that stores a program comprising instructions that, when executed by the processor, direct the processor to perform the method.

[0071] The apparatus that performs the process can include a plurality of computing devices that work together to perform the process. Some of the computing devices may work together to perform each step of a process, may work on separate steps of a process, may provide underlying services that other computing devices that may facilitate the performance of

the process. Such computing devices may act under instruction of a centralized authority. In another embodiment, such computing devices may act without instruction of a centralized authority. Some examples of apparatus that may operate in some or all of these ways may include grid computer systems, cloud computer systems, peer-to-peer computer systems, computer systems configured to provide software as a service, and so on. For example, the apparatus may comprise a computer system that executes the bulk of its processing load on a remote server but outputs display information to and receive user input information from a local user computer, such as a computer system that executes VMware software.

[0072] Further, programs that implement such methods (as well as other types of data) may be stored and transmitted using a variety of media (e.g., computer readable media) in a number of manners. In some embodiments, hard-wired circuitry or custom hardware may be used in place of, or in combination with, some or all of the software instructions that can implement the processes of various embodiments. Thus, various combinations of hardware and software may be used instead of software only.

[0073] The term "computer-readable medium" refers to any non-transitory medium, a plurality of the same, or a combination of different media, that participate in providing data (e.g., instructions, data structures) which may be read by a computer, a processor or a like device. Such a medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media include, for example, optical or magnetic disks and other persistent memory. Volatile media include dynamic random access memory (DRAM), which typically constitutes the main memory. Transmission media include coaxial cables, copper wire and fiber optics, including the wires that comprise a system bus coupled to the processor. Transmission media may include or convey acoustic waves, light waves and electromagnetic emissions, such as those generated during radio frequency (RF) and infrared (IR) data communications. Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, any other magnetic medium, a CD-ROM, DVD, any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, a RAM, a PROM, an EPROM, a FLASH-EEPROM, any other memory chip or cartridge, a carrier wave as described hereinafter, or any other medium from which a computer can read

[0074] The term "tangible computer-readable medium" refers to a "computer-readable medium" that comprises a hardware component, such as optical or magnetic disks.

[0075] Various forms of computer readable media may be involved in carrying data (e.g. sequences of instructions) to a processor. For example, data may be (i) delivered from RAM to a processor; (ii) carried over a wireless transmission medium; (iii) formatted and/or transmitted according to numerous formats, standards or protocols, such as Ethernet (or IEEE 802.3), wireless local area network communication defined by the IEEE 802.11 specifications whether or not they are approved by the WiFi Alliance, SAP, ATP, BluetoothTM, and TCP/IP, TDMA, CDMA, and 3G; and/or (iv) encrypted to ensure privacy or prevent fraud in any of a variety of ways well known in the art.

[0076] The term "database" refers to any electronically-stored collection of data that is stored in a retrievable format.

[0077] The term "data structure" refers to a database in a hardware machine such as a computer.

[0078] The term "network" means a series of points or nodes interconnected by communication paths. For example, a network can include a plurality of computers or communication devices interconnected by one or more wired and/or wireless communication paths. Networks can interconnect with other networks and contain subnetworks.

[0079] The term "predetermined" means determined beforehand, e.g., before a present time or a present action. For example, the phrase "displaying a predetermined value" means displaying a value that was determined before the act of displaying.

[0080] The term "condition" means (1) a premise upon which the fulfillment of an agreement depends, or (2) something essential to the appearance or occurrence of something else.

[0081] The term "transaction" means (1) an exchange or transfer of goods, services, or funds, or (2) a communicative action or activity involving two parties or things that reciprocally affect or influence each other.

[0082] Thus a description of a process is likewise a description of a computer-readable medium storing a program for performing the process. The computer-readable medium can store (in any appropriate format) those program elements which are appropriate to perform the method. For example, a description of a process is a description of a computer-readable storage

medium that stores a program comprising instructions that, when executed by a processor, direct the processor to perform the method.

[0083] Just as the description of various steps in a process does not indicate that all the described steps are required, embodiments of an apparatus include a computer or computing device operable to perform some (but not necessarily all) of the described process.

[0084] Likewise, just as the description of various steps in a process does not indicate that all the described steps are required, embodiments of a computer-readable medium storing a program or data structure include a computer-readable medium storing a program that, when executed, can cause a processor to perform some (but not necessarily all) of the described process.

[0085] Where databases are described, it will be understood by one of ordinary skill in the art that (i) alternative database structures to those described may be readily employed, and (ii) other memory structures besides databases may be readily employed. Any illustrations or descriptions of any sample databases presented herein are illustrative arrangements for stored representations of information. Any number of other arrangements may be employed besides those suggested by, e.g., tables illustrated in drawings or elsewhere. Similarly, any illustrated entries of the databases represent exemplary information only; one of ordinary skill in the art will understand that the number and content of the entries can be different from those described herein. Further, despite any depiction of the databases as tables, other formats (including relational databases, object-based models and/or distributed databases) could be used to store and manipulate the data types described herein. Likewise, object methods or behaviors of a database can be used to implement various processes, such as the described herein. In addition, the databases may, in a known manner, be stored locally or remotely from a device which accesses data in such a database.

[0086] Various embodiments can be configured to work in a network environment including a computer that is in communication (e.g., via a communications network) with one or more devices. The computer may communicate with the devices directly or indirectly, via any wired or wireless medium (e.g. the Internet, LAN, WAN or Ethernet, Token Ring, a telephone line, a cable line, a radio channel, an optical communications line, commercial on-line service providers, bulletin board systems, a satellite communications link, a combination of any of the above). Each of the devices may themselves comprise computers or other computing devices,

such as those based on the Intel®, Pentium®, or Centrino™, Atom™ or Core™ processor, that are adapted to communicate with the computer. Any number and type of devices may be in communication with the computer.

[0087] In an embodiment, a server computer or centralized authority may not be necessary or desirable. For example, the present invention may, in an embodiment, be practiced on one or more devices without a central authority. In such an embodiment, any functions described herein as performed by the server computer or data described as stored on the server computer may instead be performed by or stored on one or more such devices.

[0088] Where a process is described, in an embodiment the process may operate without any user intervention. In another embodiment, the process includes some human intervention (e.g., a step is performed by or with the assistance of a human).

[0089] As used herein, the term "encryption" refers to a process for obscuring or hiding information so that the information is not readily understandable without special knowledge. The process of encryption may transform raw information, called plaintext, into encrypted information. The encrypted information may be called ciphertext, and the algorithm for transforming the plaintext into ciphertext may be referred to as a cipher. A cipher may also be used for performing the reverse operation of converting the ciphertext back into plaintext. Examples of ciphers include substitution ciphers, transposition ciphers, and ciphers implemented using rotor machines.

[0090] In various encryption methods, ciphers may require a supplementary piece of information called a key. A key may consist, for example, of a string of bits. A key may be used in conjunction with a cipher to encrypt plaintext. A key may also be used in conjunction with a cipher to decrypt ciphertext. In a category of ciphers called symmetric key algorithms (e.g., private-key cryptography), the same key is used for both encryption and decryption. The sanctity of the encrypted information may thus depend on the key being kept secret. Examples of symmetric key algorithms are DES and AES. In a category of ciphers called asymmetric key algorithms (e.g., public-key cryptography), different keys are used for encryption and decryption. With an asymmetric key algorithm, any member of the public may use a first key (e.g., a public key) to encrypt plaintext into ciphertext. However, only the holder of a second key (e.g., the private key) will be able to decrypt the ciphertext back in to plaintext. An example of an asymmetric key algorithm is the RSA algorithm.

6. Continuing Applications

[0091] The present disclosure provides, to one of ordinary skill in the art, an enabling description of several embodiments and/or inventions. Some of these embodiments and/or inventions may not be claimed in the present application, but may nevertheless be claimed in one or more continuing applications that claim the benefit of priority of the present application.

[0092] Applicants intend to file additional applications to pursue patents for subject matter that has been disclosed and enabled but not claimed in the present application.

7. 35 U.S.C. § 112, paragraph 6

[0093] In a claim, a limitation of the claim which includes the phrase "means for" or the phrase "step for" means that 35 U.S.C. § 112, paragraph 6, applies to that limitation.

[0094] In a claim, a limitation of the claim which does not include the phrase "means for" or the phrase "step for" means that 35 U.S.C. § 112, paragraph 6 does not apply to that limitation, regardless of whether that limitation recites a function without recitation of structure, material or acts for performing that function. For example, in a claim, the mere use of the phrase "step of" or the phrase "steps of" in referring to one or more steps of the claim or of another claim does not mean that 35 U.S.C. § 112, paragraph 6, applies to that step(s).

[0095] With respect to a means or a step for performing a specified function in accordance with 35 U.S.C. § 112, paragraph 6, the corresponding structure, material or acts described in the specification, and equivalents thereof, may perform additional functions as well as the specified function.

[0096] Computers, processors, computing devices and like products are structures that can perform a wide variety of functions. Such products can be operable to perform a specified function by executing one or more programs, such as a program stored in a memory device of that product or in a memory device which that product accesses. Unless expressly specified otherwise, such a program need not be based on any particular algorithm, such as any particular algorithm that might be disclosed in the present application. It is well known to one of ordinary skill in the art that a specified function may be implemented via different algorithms, and any of a number of different algorithms would be a mere design choice for carrying out the specified function.

[0097] Therefore, with respect to a means or a step for performing a specified function in accordance with 35 U.S.C. § 112, paragraph 6, structure corresponding to a specified function includes any product programmed to perform the specified function. Such structure includes programmed products which perform the function, regardless of whether such product is programmed with (i) a disclosed algorithm for performing the function, (ii) an algorithm that is similar to a disclosed algorithm, or (iii) a different algorithm for performing the function.

[0098] Where there is recited a means for performing a function that is a method, one structure for performing this method includes a computing device (e.g., a general purpose computer) that is programmed and/or configured with appropriate hardware to perform that function.

[0099] Also included is a computing device (e.g., a general purpose computer) that is programmed and/or configured with appropriate hardware to perform that function via other algorithms as would be understood by one of ordinary skill in the art.

8. Disclaimer

[0100] Numerous references to a particular embodiment do not indicate a disclaimer or disavowal of additional, different embodiments, and similarly references to the description of embodiments which all include a particular feature do not indicate a disclaimer or disavowal of embodiments which do not include that particular feature. A clear disclaimer or disavowal in the present application will be prefaced by the phrase "does not include" or by the phrase "cannot perform".

9. Incorporation by Reference

[0101] Any patent, patent application or other document referred to herein is incorporated by reference into this patent application as part of the present disclosure, but only for purposes of written description and enablement in accordance with 35 U.S.C. § 112, paragraph 1, and should in no way be used to limit, define, or otherwise construe any term of the present application, unless without such incorporation by reference, no ordinary meaning would have been ascertainable by a person of ordinary skill in the art. Such person of ordinary skill in the art need not have been in any way limited by any embodiments provided in the reference. Conversely, the definitions provided in this application should not be used to limit, define, or otherwise construe any term of any document incorporated herein by reference. The definitions

set forth explicitly in this application are controlling notwithstanding the description of particular embodiments that may be incompatible with the definition(s).

[0102] Any incorporation by reference does not, in and of itself, imply any endorsement of, ratification of or acquiescence in any statements, opinions, arguments or characterizations contained in any incorporated patent, patent application or other document, unless explicitly specified otherwise in this patent application.

10. Prosecution History

[0103] In interpreting the present application (which includes the claims), one of ordinary skill in the art refers to the prosecution history of the present application, but not to the prosecution history of any other patent or patent application, regardless of whether there are other patent applications that are considered related to the present application, and regardless of whether there are other patent applications that share a claim of priority with the present application.

Detailed Description of Exemplary Embodiments

[0104] Various embodiments are directed to a method, apparatus and system for matching orders between liquidity takers and liquidity providers on a system. A memory stores instructions which, when executed, direct the at least one processor to perform various actions, such as the following. The processor may receive from a liquidity taker, an order to trade on an exchange. The order is routed to at least one liquidity provider with a target fill rate that is above a specific percentage. A response is received from the at least one liquidity provider. The response may indicate either an acceptance or a denial of the order. Based on the received response, the processor may update an actual fill rate of the at least one liquidity provider. The processor may determine, based on comparing the at least one iquidity provider's actual fill rate with the target fill rate, a level of performance for the at least one liquidity provider. The processor may transmit a report about the at least one liquidity provider's level of performance.

[0105] In some embodiments, the exchange comprises an electronic exchange system. The exchange also may comprise at least one of: a foreign exchange, an over-the-counter (OTC) market, an auction-based exchange, and a screen-based exchange. The at least one liquidity provider may agree to the target fill rate prior to trading on the exchange. The at least one

liquidity provider may agree to the specific percentage of the target fill rate prior to trading on the exchange. In some embodiments, exchange is operable on a cloud computing system.

[0106] In some embodiments, the at least one liquidity provider responds with a denial of the order, in which the denial comprises an express rejection of the order. In other embodiments, the denial comprises the at least one liquidity provider providing no response within a period of time for responding.

[0107] In some embodiments, the processor may determine the level of performance for the at least one liquidity provider by comparing the actual fill rate with the target fill rate to determine a level of performance. The processor may determine that the actual fill rate fails to meet the target fill rate. The actual fill rate may have failed to meet the target fill rate for a period of time. An indication that the actual fill rate failed to meet the target fill rate may be transmitted to the at least one liquidity provider.

[0108] In some embodiments, in response to the actual fill rate failing to meet the target fail rate, the processor may preventing any future orders from being routed to the at least one liquidity provider during a penalty period of time. The penalty period may be agreed upon prior to trading on the system.

[0109] In some embodiments, the processor provides the at least one liquidity provider with an opportunity to improve the actual fill rate. The opportunity to improve may be offered for a period of time. If at the end of the period of time to improve, the actual fill rate is still below the target fill rate, the at least one liquidity provider is prevent from receiving an orders for a penalty period of time.

[0110] In some embodiments, the processor may determine that the at least one liquidity provider triggers a threshold quantity of denials. An indication that the actual fill rate fails to meet the target fill rate may be transmitted to the liquidity provider. In response to the at least one liquidity provider triggering the threshold quality of denials, the processor may prevent any future orders from being routed to the liquidity provider during a penalty period of time. In some embodiments, the processor provides the at least one liquidity provider with an opportunity to improve the actual fill rate. The opportunity to improve may be offered for a period of time. If at the end of the period of time to improve, the actual fill rate is still below the target fill rate, the at least one liquidity provider is prevent from receiving an orders for a penalty period of time.

[0111] Various embodiments are directed to a method, apparatus and system for matching orders between liquidity takers and liquidity providers on an exchange. A memory stores instructions which, when executed, direct the at least one processor to perform various actions, such as the following. The processor may receive, based on a target fill rate being above a specific percentage, at least one order to be traded on an exchange. A response indicating either an acceptance or a denial of the received order may be transmitted. A report about a level of performance on the exchange is received. The level of performance is based on comparing the target fill rate with an actual fill rate.

[0112] In some embodiments, the actual fill rate is update after each response. The target fill rate may be determine prior to trading on the system.

[0113] In some embodiments, an indication that the actual fill rate fails to meet the target fill rate is received. In response to the actual fill rate failing to meet the target fail rate, the processor may receive an indication that any future orders will be prevented from being routed for a penalty period of time.

[0114] In some embodiments, an indication that a threshold quantity of denials has been triggered. In response to the threshold quality of denials being triggered, receiving an indication that any future orders will be prevented from being routed for a penalty period of time.

FIG. 1. Exemplary System

[0115] Some embodiments of the present invention provide systems and methods for matching orders between liquidity takers and liquidity providers based on a "first look." FIG. 1 depict a system according to at least one embodiment of the systems disclosed herein.

[0116] The system 100 may comprise one or more servers 2 coupled to one or more databases 80, one or more data providers 8a-8n, one or more end users 10a-10n, and one or more agents 12. The data providers 8a-8n, users 10a-n, agents 12, and server 2 may each communicate with each other. Users 10a-n may also communicate with other users 10 a-n.

[0117] System 100 and server 2 may perform the functions described herein for a foreign exchange, an OTC market, an auction-based exchange, a screen-based exchanged, or any financial market.

[0118] Server 2 may comprise one or more processors, computers, computer systems, computer networks, and or computer databases. Server 2 may comprise modules 18-64. Server 2 also may comprise one or more databases, such as database 80. Server 2 may communicate with users 10a-n, data providers 8, and agents 12. For instance, server 2 may communicate with a user 10a-n computer, such as a browser of a user computer, e.g. over the Internet.

[0119] Database 80 may comprise one or more processors, computers, computer systems, computer networks, and/or computer databases configured to store information. Each of database 80 may communicate with server 2, e.g., via one or more modules of server 2. For instance, search module may search one or more financial databases (e.g., a database that stores orders or counter-party preference information), e.g. via the internet, to determine one or more securities or orders that satisfy one or more parameters, such as parameters based on preferences from a user.

[0120] Price module 18 may determine and associate one or more values or prices with one or more orders, securities, portfolios or other financial entities, e.g., as described herein. For instance, price module 18 may determine a price, e.g. for an order, or to be paid to or received by a user or server, e.g., for one or more securities. For instance, price module may determine a price or value (such as a net present value) that an entity such as a liquidity taker is willing to pay for or a liquidity provider is willing to sell a particular trading order (e.g., quantity of a security offers for purchase or sale). Prices may include a current price, a historical price (e.g., a price such as a market price at a prior time, such as a week earlier), and an estimated future price (e.g., based on changing price information, such as a recent increase or decrease in a price over a recent period of time).

Databases

[0121] As shown in FIG. 1, a database 80 may be coupled to server 2. Database 80 may comprise a plurality of databases as described below. Databases 80 may store information about users, elements, and other information.

[0122] The modules may function separately or in various combinations. While the modules are shown within a single server, the modules also may operate among several servers. The modules may communicate with a plurality of databases, which also may function collectively or separately.

[0123] The modules of server 2 may store, access and otherwise interact with various sources of data, including external data, databases and other inputs.

An Exemplary Method

[0124] FIG. 2 depicts a flow diagram according to at least one embodiment of the methods disclosed herein.

[0125] It should be understood that each functions(s) described for each block may be performed using a module capable of performing that function, e.g. according to methods described for each module above. It should also be appreciated that the acts described in these blocks may be performed in any order (including but not limited to the exemplary ordering shown on the diagram), and not all blocks need be performed.

[0126] In block 200, system 100 enters into agreements with liquidity providers. In some embodiments, these agreements state that a given liquidity provider will agree to fill a certain percentage of buy/sell orders that it receives. In some embodiments, the liquidity provider agrees to respond with an acceptance of an order (e.g., respond with a "done") within a certain time frame. This time frame may be any increment of time. For example, the liquidity provider may agree to respond within 1 second or less. Every provider may have a different agreement with system 100.

[0127] In some embodiments, several liquidity providers may stream the same price. A liquidity taker may see the market and submit a buy/sell order at a certain price and size. In some embodiments, system 100 sends the order to all liquidity providers that are showing a market at the requested price. In other embodiments, the liquidity taker may indicate a desired to be matched only with a liquidity providers having a minimum target fill rate (e.g., above 85%). As such, system 100 may filter out the liquidity providers with target fill rates that falls below the requested target fill rate. In other embodiments, system 100 may automatically filter out liquidity providers with target fill rates that fall below a certain percentage, without any express request from the liquidity taker. For example, system 100 may determine that only liquidity providers with target fill rates above 85% are permitted to see all orders. System may have a tiered structure in which liquidity providers are divided into certain levels based on their target fill rates. The level that a liquidity provider is assigned determined the quantity and or quality of the orders that it see and receives. For example, system 100 may have a rule, in which all order are routed to liquidity providers with a target fill rate that is above 90%. Liquidity

providers with more conservative target fill rates, such as 60%, may not receive all available orders. Thus, liquidity providers have an incentive to agree to a higher target fill rate. The target fill rate is designated by the liquidity provider prior to being allowed to trade on system 100. In some embodiments, all prospective liquidity providers on system 100 may be prompted to indicate a target fill rate before being allowed to trade on system 100.

[0128] In block 205, system 100 (e.g., one or more processors of server 2) may receive an order, e.g., as described herein. The order may be submitted by a liquidity taker. The order may be traded on an exchange. In some embodiments, the exchange may be the foreign exchange. In other embodiments, the exchange may be an Over-the-Counter market. In other embodiments, the exchange is an auction-based exchange, such as the New York Stock Exchange (NYSE). In another embodiment, the exchange is an electronic screen-based exchange, such as NASDAQ, where buyers and sellers are connected over a network. In some embodiments, the exchange is operable on a cloud computing system, which is detailed herein.

[0129] In block 210, a processor may route the order to at least one liquidity provider having a target fill rate above a specific percentage. In block 215, a processor may receive a response from a liquidity provider which indicates either an acceptance or denial of a routed order. In some embodiments, a denial is indicated by a express rejection from the liquidity provider. In other embodiments, a denial is indicated by a lack of response from the liquidity provider over a period of time. For example, if a liquidity provider does not respond to a route order within 1 minute, system 100 will interpret the lack of response as a "no." In some embodiments, a liquidity provider may respond with "done" but the order may be matched with a different liquidity provider. For example, system 100 may match the order with the first liquidity provider that responds. In such instances, despite not being awarded the order, the liquidity provider's response of "done" still counts positively towards the actual fill rate.

[0130] In block 220, a processor may update the liquidity provider's actual fill rate based on the responses that the liquidity provider gives for routed orders. A denial from a liquidity provider counts negatively towards the provider's actual fill rate. Similarly, a response of "done", or an acceptance of an order from the liquidity provider counts positively towards the providers' actual fill rate. For example, if a liquidity provider only accepts 3 out of 5 routed orders, then system calculates the liquidity provider as having an actual fill rate of 60%.

[0131] System 100 calculates a liquidity provider's actual fill rate over a pre-determined period of time. In some embodiments, system 100 calculates the actual fill rate over the course of a day. In other embodiments, system 100 may calculate the actual fill rate over a week, a month, or any increment of time. In some embodiments, the system100 dynamically updates the liquidity provider's actual fill rate with each response to a routed order.

[0132] In block 225, the processor may compare the liquidity provider's actual fill rate with the original target fill rate. In some embodiments, a level of performance is computed from this comparison. For example, system 100 may determine that the liquidity provider is performing well, if the actual fill rate meets or exceeds the target fill rate. Conversely, if the actual fill rate fails to meet the target fill rate, system 100 may determine a poor level of performance.

[0133] In block 230, the processor may transmit a report about the level of performance to the liquidity provider. In some embodiments, the report may be sent on a regular basis over a determined frequency, such as daily, bi-weekly, weekly, month or any other increment of time.

[0134] FIG. 3 depicts a flow diagram according to at least one embodiment of the methods disclosed herein.

[0135] In block 300, the processor may determine that the liquidity provider's actual fill rate fails to meet the target fill rate. As described above, system 100 may calculate the actual fill rate over a period of time spanning a day, a week, a month, or any increment of time. In some embodiments, system 100 is comparing the liquidity provider's actual fill rate to the target fill rate to determine the level of performance. in other embodiments, system 100 keeps track of the number of times the liquidity provider responses with a "no" denial over a period of time. The liquidity provider may trigger a threshold for the quantity of denials. For example, if a liquidity provider response with 3 "no" denials over the course of a day, system 100 may be triggered with an alert.

[0136] In block 305, the processor may send a warning indication to the liquidity provider. In some embodiments, the liquidity provider is given a grace period in order to improve the actual fill rate.

[0137] At the end of the grace period, system 100 may recalculate the actual fill rate, as shown in block 310. If the liquidity provider's actual fill rate still falls below the target fill rate,

then system 100 may take the liquidity provider off the exchange, as shown in block 315. In one embodiment, the liquidity provider is prevented from trading until a criteria is met. In one embodiment, the criteria is the expiration of a penalty period of time. In another embodiment, system 100 will not route any orders to the liquidity provider during the penalty period of time. In other embodiments, the liquidity provider will be unable to log onto the system 100. In some embodiments, system 100 will send a notification to the liquidity provider indicating that trading privileges have been revoked due to the actual fill rate falling below the target fill rate. At the end of the penalty period, system 100 may send a notification to the liquidity provider, which indicates that trading privileges have been resorted.

[0138] In block 320, the processor may receive from the liquidity provider a request to change the original target fill rate. In some embodiments, the liquidity provider may wish to lower the target fill rate. Where a liquidity provider has been penalized multiple times, system 100 may wish to speak with a representative of the liquidity provider to perform further analysis

[0139] FIG. 4 depicts a flow diagram according to at least one embodiment of the methods disclosed herein.

[0140] In block 400, a liquidity provider on a remote device may receive an order from a liquidity taker on system 100. In some embodiments, the liquidity provider receives the order based on its indicated target fill rate. For example, the liquidity provider may have a target fill rate of 80% and the liquidity taker requested that system 100 only routes its orders with liquidity providers having fill rates above 70%.

[0141] In block 405, the liquidity provider may transmit a response indicating either an acceptance or a denial of the received order.

[0142] In block 410, the liquidity provider receives a report about its level of performance on the exchange. The level of performance is based on comparing the target fill rate with an actual fill rate. In some embodiments, the actual fill rate is update after each response. In some embodiments, the report is positive, indicating that the level of performance is consistent with the target fill rate. In other embodiments, the report indicates that there is room for improvement. The report may indicate that the level of performance is falling below the target fill rate.

[0143] In block 415, the liquidity provider may receive a warning that the level of performance has fallen below the target fill rate for a specified period of time. The liquidity provider may be given with an opportunity to improve the level of performance during a grace period of time.

[0144] In block 420, the liquidity provider may receive an indication that trading privileges will be suspended due to poor level of performance. The suspension period may last for a penalty period of time. At the end of the penalty period, the liquidity provider may receive a notice that trading privileges have been reinstated, as shown in block 425.

[0145] In block 430, the liquidity provider may submit a request to change the target fill rate to a different target fill rate.

Cloud Computing

[0146] It is understood in advance that although this disclosure includes a detailed description of cloud computing, implementation of the teachings recited herein are not limited to a cloud computing environment. Rather, embodiments of the present invention are capable of being implemented in conjunction with any other type of computing environment now known or later developed.

[0147] Cloud computing is a model of service delivery for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, network bandwidth, servers, processing, memory, storage, applications, virtual machines, and services) that can be rapidly provisioned and released with minimal management effort or interaction with a provider of the service. This cloud model may include at least five characteristics, at least three service models, and at least four deployment models.

1. Characteristics

[0148] Some characteristics of cloud computing are as follows:

a. On-demand self-service

[0149] A cloud consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed, automatically without requiring human interaction with the service's provider.

[0150] Broad network access: capabilities are available over a network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, laptops, and PDAs).

b. Resource pooling

[0151] The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to demand. There is a sense of location independence in that the consumer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter).

c. Rapid elasticity

[0152] Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.

d. Measured service

[0153] Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service.

2. Service Models

[0154] Various types of service models are as follows:

a. Software as a Service (SaaS)

[0155] The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

b. Platform as a Service (PaaS)

[0156] The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including networks, servers, operating systems, or storage, but has control over the deployed applications and possibly application-hosting environment configurations.

c. Infrastructure as a Service (IaaS).

[0157] The capability provided to the consumer is to provision processing, storage, networks, and othe fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).

3. Deployment Models

[0158] Various types of deployment models include:

a. Private cloud.

[0159] The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on-premises or off-premises.

b. Community cloud

[0160] The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on-premises or off-premises.

c. Public cloud

[0161] The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.

d. Hybrid cloud.

[0162] The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or

proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

[0163] A cloud computing environment is service oriented with a focus on statelessness, low coupling, modularity, and semantic interoperability. At the heart of cloud computing is an infrastructure comprising a network of interconnected nodes.

[0164] Referring now to FIG. 5, a schematic of an example of a cloud computing node is shown. Cloud computing node 10 is only one example of a suitable cloud computing node and is not intended to suggest any limitation as to the scope of use or functionality of embodiments of the invention described herein. Regardless, cloud computing node 10 is capable of being implemented and/or performing any of the functionality set forth hereinabove.

[0165] In cloud computing node 10, there is a computer system/server 12, which is operational with numerous other general purpose or special purpose computing system environments or configurations. Examples of well-known computing systems, environments, and/or configurations that may be suitable for use with computer system/server 12 include, but are not limited to, personal computer systems, server computer systems, thin clients, thick clients, hand-held or laptop devices, multiprocessor systems, microprocessor-based systems, set top boxes, programmable consumer electronics, network PCs, minicomputer systems, mainframe computer systems, and distributed cloud computing environments that include any of the above systems or devices, and the like.

[0166] Computer system/server 12 may be described in the general context of computer system-executable instructions, such as program modules, being executed by a computer system. Generally, program modules may include routines, programs, objects, components, logic, data structures, and so on, that perform particular tasks or implement particular abstract data types. Computer system/server 12 may be practiced in distributed cloud computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed cloud computing environment, program modules may be located in both local and remote computer system storage media including memory storage devices.

[0167] As shown in FIG. 5, computer system/server 505 in cloud computing node 500 is shown in the form of a general-purpose computing device. The components of computer

system/server 505 may include, but are not limited to, one or more processors or processing units 515, a system memory 540, and a bus 520 that couples various system components including system memory 540 to processor 515.

[0168] Bus 520 represents one or more of any of several types of bus structures, including a memory bus or memory controller, a peripheral bus, an accelerated graphics port, and a processor or local bus using any of a variety of bus architectures. By way of example, and not limitation, such architectures include Industry Standard Architecture (ISA) bus, Micro Channel Architecture (MCA) bus, Enhanced ISA (EISA) bus, Video Electronics Standards Association (VESA) local bus, and Peripheral Component Interconnects (PCI) bus.

[0169] Computer system/server 505 typically includes a variety of computer system readable media. Such media may be any available media that is accessible by computer system/server 505, and it includes both volatile and non-volatile media, removable and non-removable media.

[0170] System memory 540 can include computer system readable media in the form of volatile memory, such as random access memory (RAM) 545 and/or cache memory 550. Computer system/server 505 may further include other removable/non-removable, volatile/non-volatile computer system storage media. By way of example only, storage system 555 can be provided for reading from and writing to a non-removable, non-volatile magnetic media (not shown and typically called a "hard drive"). Although not shown, a magnetic disk drive for reading from and writing to a removable, non-volatile magnetic disk (e.g., a "floppy disk"), and an optical disk drive for reading from or writing to a removable, non-volatile optical disk such as a CD-ROM, DVD-ROM, or other optical media can be provided. In such instances, each can be connected to bus 520 by one or more data media interfaces. As will be further depicted and described below, memory 540 may include at least one program product having a set (e.g., at least one) of program modules that are configured to carry out the functions of embodiments of the invention.

[0171] The embodiments of the invention may be implemented as a computer readable signal medium, which may include a propagated data signal with computer readable program code embodied therein (e.g., in baseband or as part of a carrier wave). Such a propagated signal may take any of a variety of forms including, but not limited to, electro-magnetic, optical, or any suitable combination thereof. A computer readable signal medium may be any computer readable medium that is not a computer readable storage medium and that can communicate,

propagate, or transport a program for use by or in connection with an instruction execution system, apparatus, or device.

[0172] Program code embodied on a computer readable medium may be transmitted using any appropriate medium including, but not limited to, wireless, wireline, optical fiber cable, radio-frequency (RF), etc., or any suitable combination of the foregoing.

[0173] Job priority program/utility 560, having a set (at least one) of program modules 565, may be stored in memory 540 by way of example, and not limitation, as well as an operating system, one or more application programs, other program modules, and program data. Each of the operating system, one or more application programs, other program modules, and program data or some combination thereof, may include an implementation of a networking environment. Program modules 565 generally carry out the functions and/or methodologies of embodiments of the invention as described herein.

[0174] Computer system/server 505 may also communicate with one or more external devices 14 such as a keyboard, a pointing device, a display 535, etc.; one or more devices that enable a user to interact with computer system/server 505; and/or any devices (e.g., network card, modem, etc.) that enable computer system/server 505 to communicate with one or more other computing devices. Such communication can occur via I/O interfaces 530. Still yet, computer system/server 505 can communicate with one or more networks such as a local area network (LAN), a general wide area network (WAN), and/or a public network (e.g., the Internet) via network adapter 525. As depicted, network adapter 525 communicates with the other components of computer system/server 505 via bus 520. It should be understood that although not shown, other hardware and/or software components could be used in conjunction with computer system/server 505. Examples include, but are not limited to: microcode, device drivers, redundant processing units, external disk drive arrays, RAID systems, tape drives, and data archival storage systems, etc.

[0175] Referring now to FIG. 6, illustrative cloud computing environment 600 is depicted. As shown, cloud computing environment 600 comprises one or more cloud computing nodes 500 with which local computing devices used by cloud consumers, such as, for example, personal digital assistant (PDA) or cellular telephone 605A, desktop computer 605B, laptop computer 605C, and/or automobile computer system 605N may communicate. Nodes 500 may communicate with one another. They may be grouped (not shown) physically or virtually, in one

or more networks, such as private, community, public, or hybrid clouds as described hereinabove, or a combination thereof. This allows cloud computing environment 600 to offer infrastructure, platforms, and/or software as services for which a cloud consumer does not need to maintain resources on a local computing device. It is understood that the types of computing devices 605A-N shown in FIG. 6 are intended to be illustrative only and that computing nodes 500 and cloud computing environment 600 can communicate with any type of computerized device over any type of network and/or network addressable connection (e.g., using a web browser).

[0176] Referring now to FIG. 7, a set of functional abstraction layers provided by cloud computing environment 600 (FIG. 6) is shown. It should be understood in advance that the components, layers, and functions shown in FIG. 7 are intended to be illustrative only and embodiments of the invention are not limited thereto. As depicted, the following layers and corresponding functions are provided:

[0177] Hardware and software layer 700 includes hardware and software components. Examples of hardware components include mainframes. In one example, IBM.RTM. zSeries.RTM. systems and RISC (Reduced Instruction Set Computer) architecture based servers. In one example, IBM pSeries.RTM. systems, IBM xSeries.RTM. systems, IBM BladeCenter.RTM. systems, storage devices, networks, and networking components. Examples of software components include network application server software. In one example, IBM WebSphere.RTM. application server software and database software. In one example, IBM DB2.RTM. database software. (IBM, zSeries, pSeries, xSeries, BladeCenter, WebSphere, and DB2 are trademarks of International Business Machines Corporation registered in many jurisdictions worldwide.)

[0178] Virtualization layer 705 provides an abstraction layer from which the following examples of virtual entities may be provided: virtual servers; virtual storage; virtual networks, including virtual private networks; virtual applications and operating systems; and virtual clients.

[0179] In one example, management layer 710 may provide the functions described below. Resource provisioning provides dynamic procurement of computing resources and other resources that are utilized to perform tasks within the cloud computing environment. Metering and pricing provide income tracking as resources are utilized within the cloud computing

environment, and billing or invoicing for consumption of these resources. In one example, these resources may comprise application software licenses. Security provides identity verification for cloud consumers and tasks, as well as protection for data and other resources. User portal provides access to the cloud computing environment for consumers and system administrators. Service level management provides cloud computing resource allocation and management such that required service levels are met. Service Level Agreement (SLA) planning and fulfillment provides pre-arrangement for, and procurement of, cloud computing resources for which a future requirement is anticipated in accordance with an SLA.

[0180] Workloads layer 715 provides examples of functionality for which the cloud computing environment may be utilized. Examples of workloads and functions which may be provided from this layer include: determining the target fill rate for liquidity providers based on their response to routed orders; updating actual fill rates with received responses; and determining levels of performance. As mentioned above, all of the foregoing examples described with respect to FIG. 7 are illustrative only, and the invention is not limited to these examples.

[0181] It is understood all functions of the present invention as described herein are typically performed by the job prioritization, which can be tangibly embodied as modules of program code 565 of job priority program/utility 560 (FIG. 5). However, this need not be the case. Rather, the functionality recited herein could be carried out/implemented and/or enabled by any of the layers 700-715 shown in FIG. 7.

[0182] It is reiterated that although this disclosure includes a detailed description on cloud computing, implementation of the teachings recited herein are not limited to a cloud computing environment. Rather, the embodiments of the present invention are intended to be implemented with any type of clustered computing environment now known or later developed.

What is claimed is:

1. A method comprising:

receiving, via a processor from a liquidity taker, an order to trade on an exchange;

routing, via the processor, the order to at least one liquidity provider having a target fill rate above a specific percentage;

receiving, via the processor, a response from the at least one liquidity provider, in which the response indicates either an acceptance or a denial of the order;

updating, via the processor based on the received response, an actual fill rate of the at least one liquidity provider;

determining, based on comparing the at least one liquidity provider's actual fill rate with the target fill rate, a level of performance for the at least one liquidity provider; and

transmitting, via the processor to a remote device, a report about the at least one liquidity provider's level of performance, in which the remote device and the processor are in electronic communication over a network.

2. The method of claim 1, in which the at least one liquidity provider agrees to the target fill rate prior to trading on the exchange.

3. The method of claim 1, in which the denial comprises:

receiving no response from the at least one liquidity provider within a period of time for responding.

4. The method of claim 1, in which determining the level of performance for the at least one liquidity provider further comprises:

comparing the actual fill rate with the target fill rate to determine a level of performance.

5. The method of claim 1 further comprising:

determining that the actual fill rate fails to meet the target fill rate.

6. The method of claim 5 further comprising:

in response to the actual fill rate failing to meet the target fail rate, preventing any future orders from being routed to the at least one liquidity provider during a penalty period of time.

7. The method of claim 5 further comprising:

determining that the actual fill rate fails to meet the target fill rate for a period of time.

8. The method of claim 5 further comprising:

transmitting an indication that the actual fill rate failed to meet the target fill rate.

9. The method of claim 5 further comprising:

providing the at least one liquidity provider with an opportunity to improve the actual fill rate.

10. The method of claim 1 further comprising:

determining that the at least one liquidity provider triggers a threshold quantity of denials.

11. The method of claim 10 further comprising:

in response to the at least one liquidity provider triggering the threshold quality of denials, preventing any future orders from being routed to the at least one liquidity provider during a penalty period of time.

12. The method of claim 1, in which the exchange is operable on a cloud computing system.

13. An method comprising:

receiving, based on a target fill rate being above a specific percentage, at least one order to be traded on an exchange;

transmitting a response indicating either an acceptance or a denial of the received order; and

receiving a report about a level of performance on the exchange, in which the level of performance is based on comparing the target fill rate with an actual fill rate.

14. The method of claim 13, in which the actual fill rate is update after each response.

15. The method of claim 13, in which the target fill rate is determine prior to trading on the system.

16. The method of claim 13 further comprising:

receiving an indication that the actual fill rate fails to meet the target fill rate.

17. The method of claim 16 further comprising:

in response to the actual fill rate failing to meet the target fail rate, receiving an indication that any future orders will be prevented from being routed for a penalty period of time.

18. An apparatus comprising:

a processor; and

a memory, in which the memory stores instructions which, when executed by the processor, direct the processor to:

receive, from a liquidity taker, an order to trade on an exchange;

route the order to at least one liquidity provider having a target fill rate above a specific percentage;

receive a response from the at least one liquidity provider, in which the response indicates either an acceptance or a denial of the order;

update the at least one liquidity provider's actual fill rate based on the received response;

compare the at least one liquidity provider's actual fill rate with the target fill rate to determine a level of performance; and

transmit a report about the at least one liquidity provider's level of performance.

19. The apparatus of claim 18, in which the at least one liquidity provider agrees to the target fill rate prior to trading on the exchange.

20. The apparatus of claim 18, in which the memory stores instructions which, when executed by the processor, direct the processor to:

receive no response from the at least one liquidity provider within a period of time for responding.

21. The apparatus of claim 18, in which the memory stores instructions which, when executed by the processor, direct the processor to:

compare the actual fill rate with the target fill rate to determine a level of performance.

22. The apparatus of claim 18, in which the memory stores instructions which, when executed by the processor, direct the processor to:

determine that the actual fill rate fails to meet the target fill rate.

23. The apparatus of claim 22, in which the memory stores instructions which, when executed by the processor, direct the processor to:

in response to the actual fill rate failing to meet the target fail rate, prevent any future orders from being routed to the at least one liquidity provider during a penalty period of time.

24. The apparatus of claim 22, in which the memory stores instructions which, when executed by the processor, direct the processor to:

determine that the actual fill rate fails to meet the target fill rate for a period of time.

25. The apparatus of claim 22, in which the memory stores instructions which, when executed by the processor, direct the processor to:

transmit an indication that the actual fill rate failed to meet the target fill rate.

26. The apparatus of claim 22, in which the memory stores instructions which, when executed by the processor, direct the processor to:

provide the at least one liquidity provider with an opportunity to improve the actual fill rate.

27. The apparatus of claim 18, in which the memory stores instructions which, when executed by the processor, direct the processor to:

determine that the at least one liquidity provider triggers a threshold quantity of denials.

28. The apparatus of claim 27, in which the memory stores instructions which, when executed by the processor, direct the processor to:

in response to the at least one liquidity provider triggering the threshold quality of denials, prevent any future orders from being routed to the at least one liquidity provider during a penalty period of time.

29. The apparatus of claim 18, in which the exchange is operable on a cloud computing system.

30. An apparatus comprising:

a processor; and

a memory, in which the memory stores instructions which, when executed by the processor, direct the processor to:

receive, based on a target fill rate being above a specific percentage, at least one order to be traded on an exchange;

transmit a response indicating either an acceptance or a denial of the received order; and

receive a report about a level of performance on the exchange, in which the level of performance is based on comparing the target fill rate with an actual fill rate.

31. The apparatus of claim 30, in which the actual fill rate is update after each response.

32. The apparatus of claim 30, in which the target fill rate is determine prior to trading on the system.

33. The apparatus of claim 30, in which the memory stores instructions which, when executed by the processor, direct the processor to:

receive an indication that the actual fill rate fails to meet the target fill rate.

34. The apparatus of claim 33, in which the memory stores instructions which, when executed by the processor, direct the processor to:

in response to the actual fill rate failing to meet the target fail rate, receive an indication that any future orders will be prevented from being routed for a penalty period of time.

35. An article of manufacture comprising:

a tangible, non-transitory computer-readable medium, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

receive, from a liquidity taker, an order to trade on an exchange;

route the order to at least one liquidity provider having a target fill rate above a specific percentage;

receive a response from the at least one liquidity provider, in which the response indicates either an acceptance or a denial of the order;

update the at least one liquidity provider's actual fill rate based on the received response;

compare the at least one liquidity provider's actual fill rate with the target fill rate to determine a level of performance; and

transmit a report about the at least one liquidity provider's level of performance.

36. The article of manufacture of claim 35, in which the at least one liquidity provider agrees to the target fill rate prior to trading on the exchange.

37. The article of manufacture of claim 35, in which the memory stores instructions which, when executed by the processor, direct the processor to:

receive no response from the at least one liquidity provider within a period of time for responding.

38. The article of manufacture of claim 35, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

compare the actual fill rate with the target fill rate to determine a level of performance.

39. The article of manufacture of claim 35, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

determine that the actual fill rate fails to meet the target fill rate.

40. The article of manufacture of claim 39, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

in response to the actual fill rate failing to meet the target fail rate, prevent any future orders from being routed to the at least one liquidity provider during a penalty period of time.

41. The article of manufacture of claim 39, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

determine that the actual fill rate fails to meet the target fill rate for a period of time.

42. The article of manufacture of claim 39, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

transmit an indication that the actual fill rate failed to meet the target fill rate.

43. The article of manufacture of claim 39, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

provide the at least one liquidity provider with an opportunity to improve the actual fill rate.

44. The article of manufacture of claim 35, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

determine that the at least one liquidity provider triggers a threshold quantity of denials.

45. The article of manufacture of claim 27, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

in response to the at least one liquidity provider triggering the threshold quality of denials, prevent any future orders from being routed to the at least one liquidity provider during a penalty period of time.

46. The article of manufacture of claim 35, in which the exchange is operable on a cloud computing system.

47. An article of manufacture comprising:

a tangible, non-transitory computer-readable medium, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

receive, based on a target fill rate being above a specific percentage, at least one order to be traded on an exchange;

transmit a response indicating either an acceptance or a denial of the received order; and

receive a report about a level of performance on the exchange, in which the level of performance is based on comparing the target fill rate with an actual fill rate.

48. The article of manufacture of claim 47, in which the actual fill rate is update after each response.

49. The article of manufacture of claim 47, in which the target fill rate is determine prior to trading on the system.

50. The article of manufacture of claim 47, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

receive an indication that the actual fill rate fails to meet the target fill rate.

51. The article of manufacture of claim 50, in which the tangible, non-transitory computer-readable medium stores instructions which, when executed by a processor, direct the processor to:

in response to the actual fill rate failing to meet the target fail rate, receive an indication that any future orders will be prevented from being routed for a penalty period of time.

FIG. 1

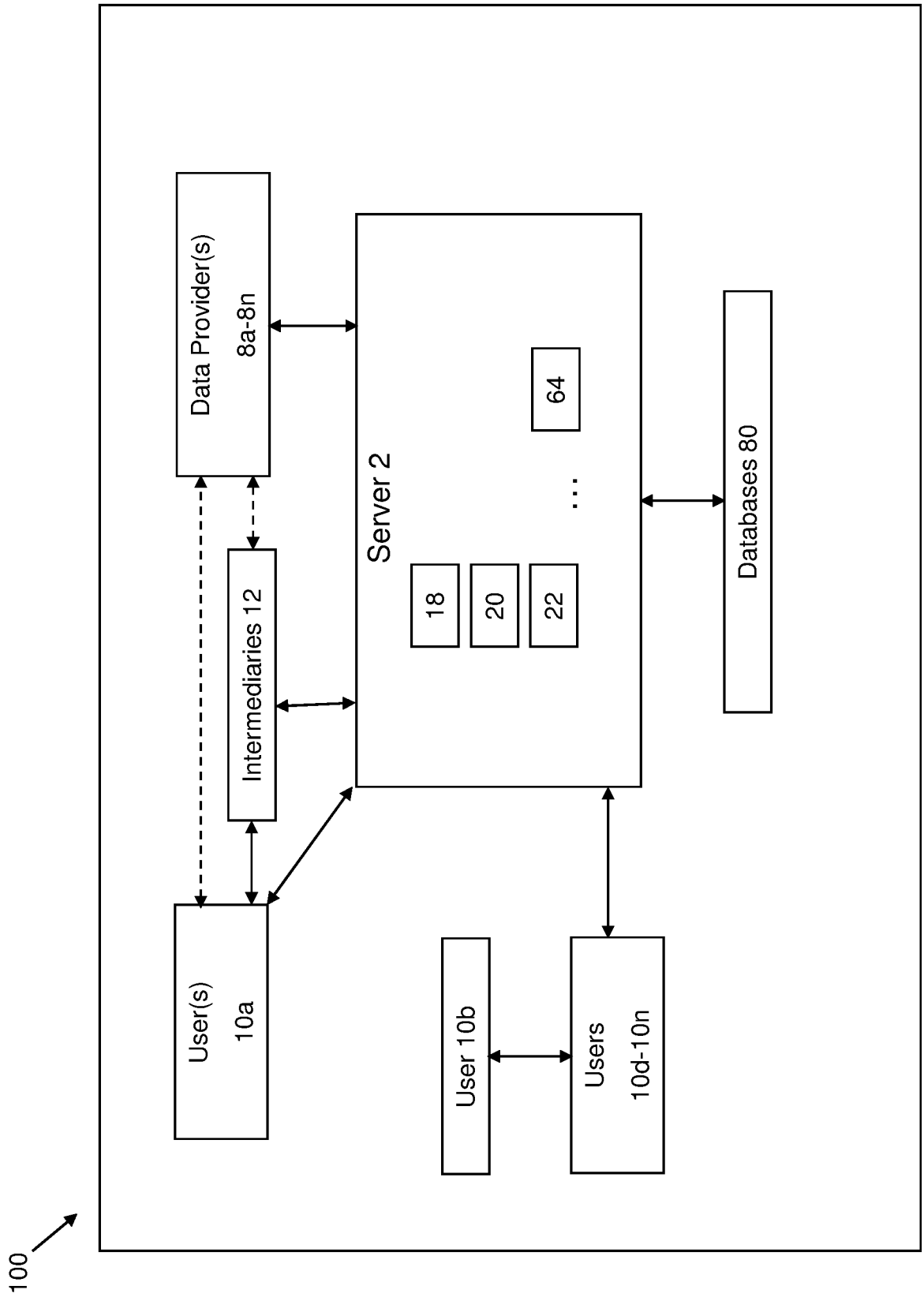

100
Data Provider(s)
8a-8n
Intermediaries 12
User(s)
10a
Server 2
18
20
22
64
Databases 80
User 10b
Users
10d-10n

FIG. 2

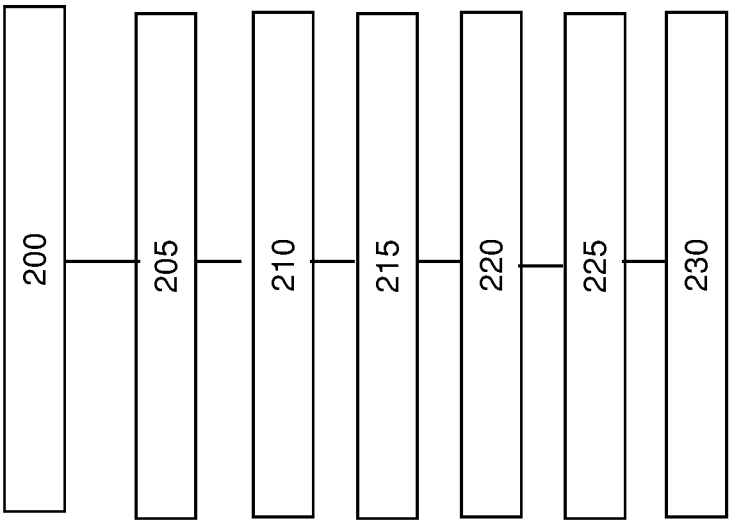


FIG. 3

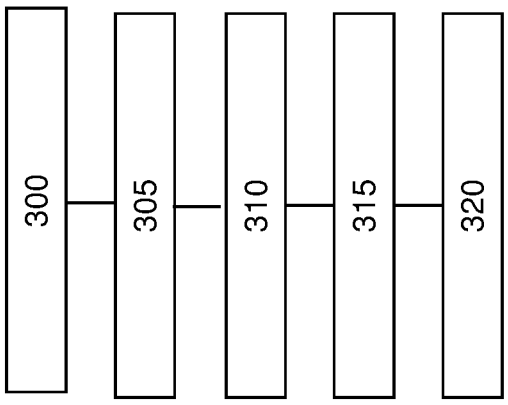


FIG. 4

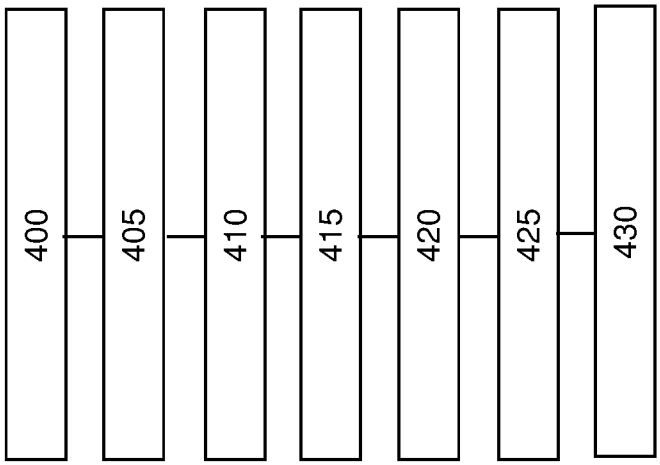


FIG. 5

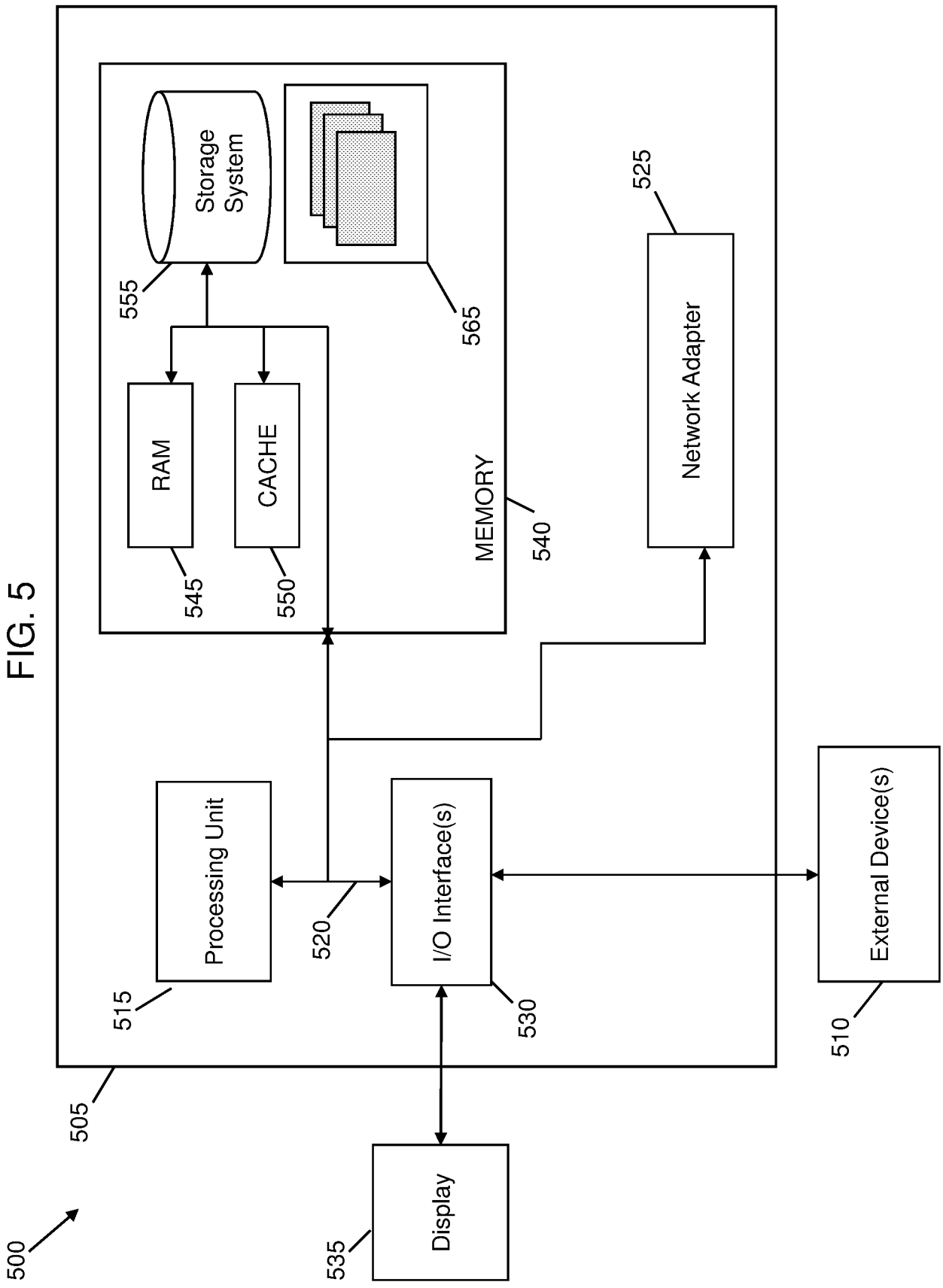
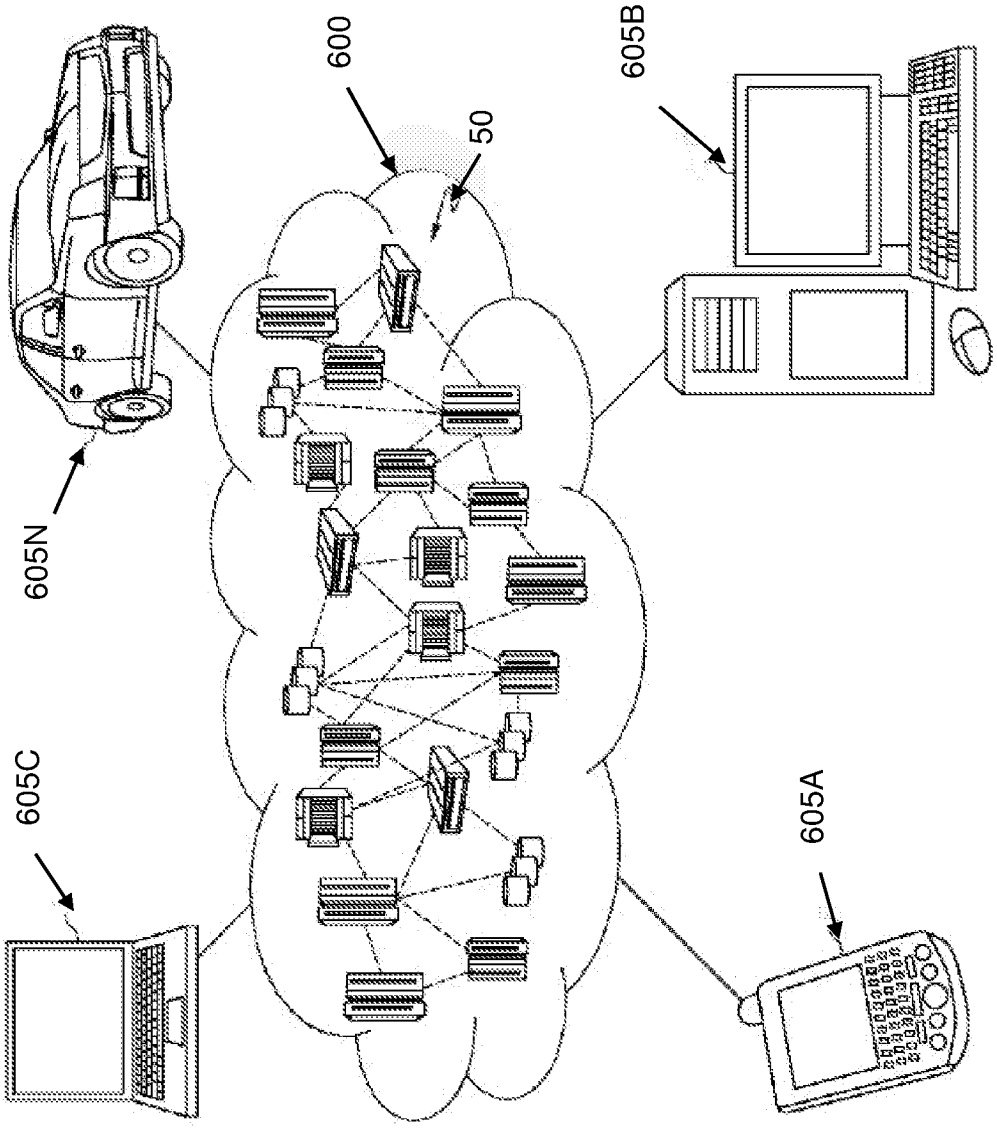

500
505
Storage System
555
565
RAM
CACHE
545
550
MEMORY
540
525
Network Adapter
Processing Unit
515
520
I/O Interface(s)
530
External Device(s)
510
Display
535

FIG. 6



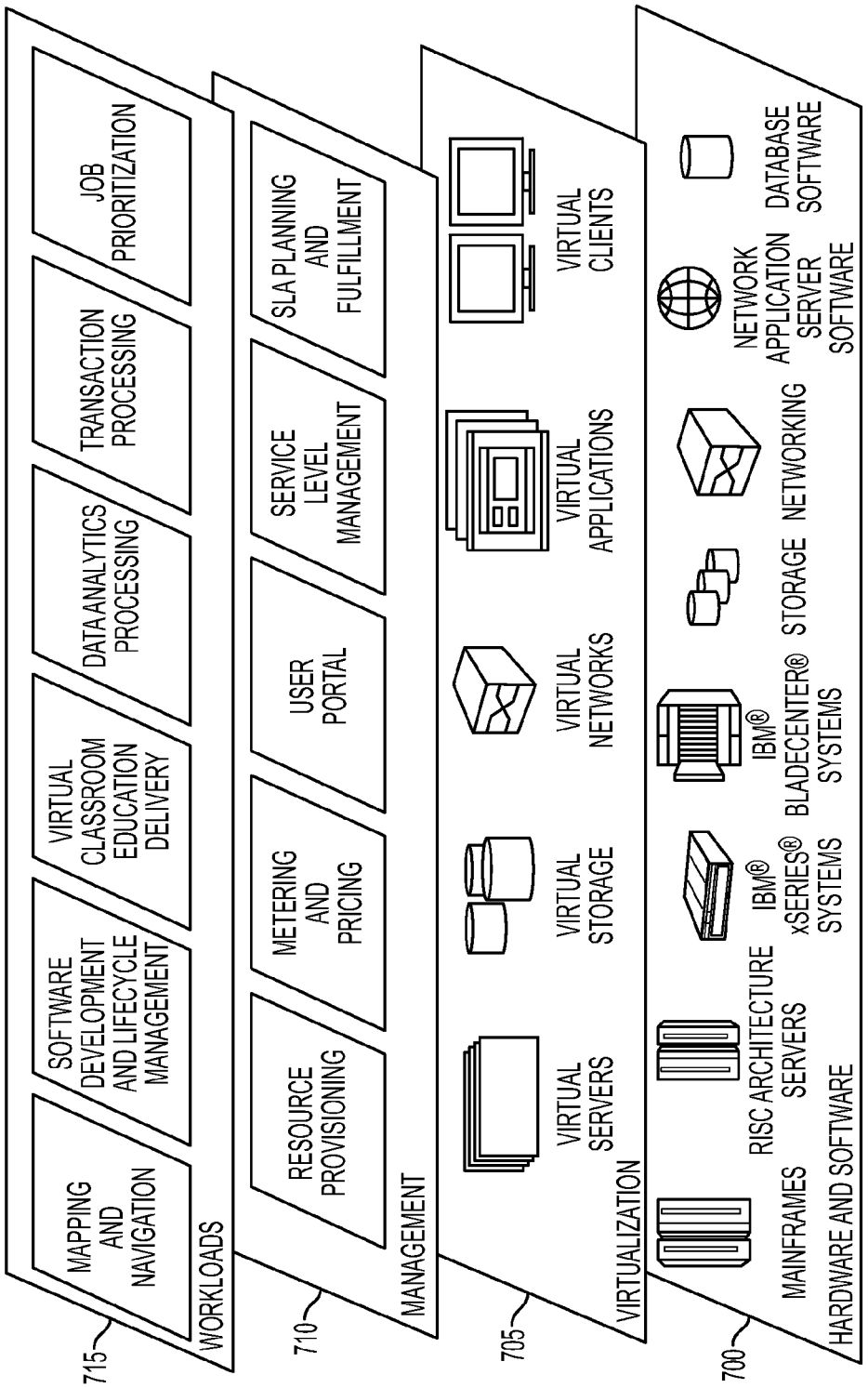

715
710
705
700
WORKLOADS
MAPPING AND NAVIGATION
SOFTWARE DEVELOPMENT AND LIFECYCLE MANAGEMENT
VIRTUAL CLASSROOM EDUCATION DELIVERY
DATA ANALYTICS PROCESSING
TRANSACTION PROCESSING
JOB PRIORITIZATION
MANAGEMENT
RESOURCE PROVISIONING
METERING AND PRICING
USER PORTAL
SERVICE LEVEL MANAGEMENT
SLA PLANNING AND FULFILLMENT
VIRTUALIZATION
VIRTUAL SERVERS
VIRTUAL STORAGE
VIRTUAL NETWORKS
VIRTUAL APPLICATIONS
VIRTUAL CLIENTS
HARDWARE AND SOFTWARE
MAINFRAMES
RISC ARCHITECTURE SERVERS
IBM® xSERIES® SYSTEMS
IBM® BLADECENTER® SYSTEMS
STORAGE
NETWORKING
NETWORK APPLICATION SERVER SOFTWARE
DATABASE SOFTWARE

FIG. 7

INTERNATIONAL SEARCH REPORT

~~14/064467 20.02.2015~~

International application No.
PCT/US 14/64467

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G06Q 40/00 (2015.01)
CPC - G06Q 40/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC (8) - G06Q 40/00 (2015.01)
CPC - G06Q 40/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - G06Q 40/06; G06Q 40/04 (See Keywords Below)
USPC - 705/37, 705/500

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Thomsoninnovation.com; Patbase; Google Scholar; Google Patents; Gogole.com; Freepatentsonline; ProQuest Dialog
Search Terms: Trading, trade, order, route, distribute, liquidity provider, exchange, track, monitor, performance, rating, score, rank, execution rate, fill rate, feedback, response, deny, accept, update, modify, report, notification, etc

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2011/0191229 A1 (MITTAL et al.), 04 August 2011 (04.08.2011), entire document, especially Abstract; Para [0011]-[0012], [0042], [0065]-[0067], [0070]-[0073], [0075]-[0076]	1-51
Y	US 2008/0288308 A1 (PENNEY et al.), 20 November 2008 (20.11.2008), entire document, especially Abstract; Para [0030], [0035], [0061], [0387]-[0388]	1-51
A	US 20110258100 A1 (KRISHNA et al.), 20 October 2011 (20.10.2011), entire document	1-51
A	US 20050114257 A1 (PENNEY), 26 May 2005 (26.05.2005), entire document	1-51

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 January 2015 (30.01.2015)	20 FEB 2015
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

(19)中华人民共和国国家知识产权局

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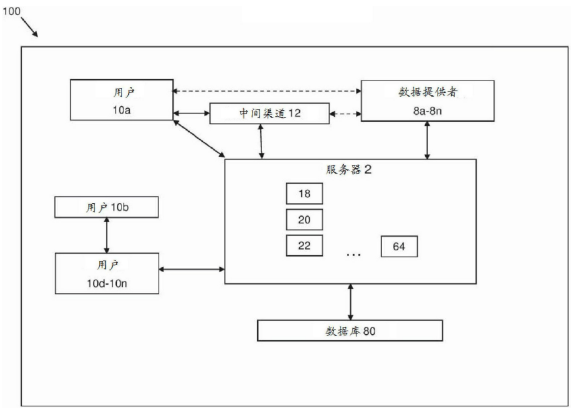
用于订单的首次曝光匹配的方法、设备和系统

(57)摘要

各种实施方案是关于一种用于匹配流动性接受者与流动性提供者之间的订单的交易系统和方法。存储器存储指令，所述指令在执行时引导处理器来进行诸如以下的各种动作。所述处理器可以从流动性接受者接收订单以在交易所交易。将所述订单传送至目标成交率超过特定百分比的至少一个流动性提供者。从所述至少一个流动性提供者接收响应。基于所述接收的响应，所述处理器可以更新所述至少一个流动性提供者的实际成交率。所述处理器可以基于比较所述流动性提供者的实际成交率与所述目标成交率来确定所述至少一个流动性提供者的绩效水平。所述处理器可以传输与所述至少一个流动性提供者的绩效水平有关的报告。



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1.一种方法,其包括:

通过处理器从流动性接受者接收订单以在交易所交易;

通过所述处理器将所述订单传送至目标成交率超过特定百分比的至少一个流动性提供者;

通过所述处理器从所述至少一个流动性提供者接收响应,其中所述响应指示接受或拒绝所述订单;

基于所述接收的响应,通过所述处理器来更新所述至少一个流动性提供者的实际成交率;

基于比较所述至少一个流动性提供者的实际成交率与所述目标成交率来确定所述至少一个流动性提供者的绩效水平;以及

通过所述处理器向远程装置传输与所述至少一个流动性提供者的绩效水平有关的报告,其中所述远程装置和所述处理器通过网络来电子通信。

2.如权利要求1所述的方法,其中所述至少一个流动性提供者在所述交易所交易之前同意所述目标成交率。

3.如权利要求1所述的方法,其中所述拒绝包括:

在针对响应的时间段内未从所述至少一个流动性提供者接收到响应。

4.如权利要求1所述的方法,其中确定所述至少一个流动性提供者的所述绩效水平还包括:

将所述实际成交率与所述目标成交率进行比较以确定绩效水平。

5.如权利要求1所述的方法,其还包括:

确定所述实际成交率未能满足所述目标成交率。

6.如权利要求5所述的方法,其还包括:

响应于所述实际成交率未能满足所述目标成交率,防止任何将来的订单在惩罚时间段期间传送至所述至少一个流动性提供者。

7.如权利要求5所述的方法,其还包括:

确定所述实际成交率在一时间段内未能满足所述目标成交率。

8.如权利要求5所述的方法,其还包括:

传输所述实际成交率未能满足所述目标成交率的指示。

9.如权利要求5所述的方法,其还包括:

向所述至少一个流动性提供者提供提高所述实际成交率的机会。

10.如权利要求1所述的方法,其还包括:

确定所述至少一个流动性提供者触发拒绝阈值量。

11.如权利要求10所述的方法,其还包括:

响应于所述至少一个流动性提供者触发所述拒绝阈值量,防止任何将来的订单在惩罚时间段期间传送至所述至少一个流动性提供者。

12.如权利要求1所述的方法,其中所述交易所在云计算系统上可操作。

13.一种方法,其包括:

基于目标成交率超过特定百分比来接收至少一个订单以在交易所交易;

传输指示接受或拒绝所述接收的订单的响应;以及

接收与所述交易所的绩效水平有关的报告，其中所述绩效水平是基于比较所述目标成交率与实际成交率。

14.如权利要求13所述的方法，其中在每次响应之后更新所述实际成交率。

15.如权利要求13所述的方法，其中在所述系统上交易之前确定所述目标成交率。

16.如权利要求13所述的方法，其还包括：

接收所述实际成交率未能满足所述目标成交率的指示。

17.如权利要求16所述的方法，其还包括：

响应于所述实际成交率未能满足所述目标成交率，接收将在惩罚时间段内防止传送任何将来的订单的指示。

18.一种设备，其包括：

处理器；以及

存储器，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

从流动性接受者接收订单以在交易所交易；

将所述订单传送至目标成交率超过特定百分比的至少一个流动性提供者；

从所述至少一个流动性提供者接收响应，其中所述响应指示接受或拒绝所述订单；

基于所述接收的响应来更新所述至少一个流动性提供者的实际成交率；

将所述至少一个流动性提供者的实际成交率与所述目标成交率进行比较以确定绩效水平；以及

传输与所述至少一个流动性提供者的绩效水平有关的报告。

19.如权利要求18所述的设备，其中所述至少一个流动性提供者在所述交易所交易之前同意所述目标成交率。

20.如权利要求18所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

在针对响应的时间段内未从所述至少一个流动性提供者接收到响应。

21.如权利要求18所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

将所述实际成交率与所述目标成交率进行比较以确定绩效水平。

22.如权利要求18所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

确定所述实际成交率未能满足所述目标成交率。

23.如权利要求22所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

响应于所述实际成交率未能满足所述目标成交率，防止任何将来的订单在惩罚时间段期间传送至所述至少一个流动性提供者。

24.如权利要求22所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

确定所述实际成交率在一时间段内未能满足所述目标成交率。

25.如权利要求22所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

传输所述实际成交率未能满足所述目标成交率的指示。

26.如权利要求22所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

向所述至少一个流动性提供者提供提高所述实际成交率的机会。

27.如权利要求18所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

确定所述至少一个流动性提供者触发拒绝阈值量。

28.如权利要求27所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

响应于所述至少一个流动性提供者触发所述拒绝阈值量，防止任何将来的订单在惩罚时间段期间传送至所述至少一个流动性提供者。

29.如权利要求18所述的设备，其中所述交易所在云计算系统上可操作。

30.一种设备，其包括：

处理器；以及

存储器，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

基于目标成交率超过特定百分比来接收至少一个订单以在交易所交易；

传输指示接受或拒绝所述接收的订单的响应；以及

接收与所述交易所的绩效水平有关的报告，其中所述绩效水平是基于比较所述目标成交率与实际成交率。

31.如权利要求30所述的设备，其中所述实际成交率是在每次响应之后更新。

32.如权利要求30所述的设备，其中所述目标成交率是在所述系统上交易之前确定。

33.如权利要求30所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

接收所述实际成交率未能满足所述目标成交率的指示。

34.如权利要求33所述的设备，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

响应于所述实际成交率未能满足所述目标成交率，接收将在惩罚时间段内防止传送任何将来的订单的指示。

35.一种制品，其包括：

有形非暂时计算机可读介质，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

从流动性接受者接收订单以在交易所交易；

将所述订单传送至目标成交率超过特定百分比的至少一个流动性提供者；

从所述至少一个流动性提供者接收响应，其中所述响应指示接受或拒绝所述订单；

基于所述接收的响应来更新所述至少一个流动性提供者的实际成交率；

将所述至少一个流动性提供者的实际成交率与所述目标成交率进行比较以确定绩效水平；以及

传输与所述至少一个流动性提供者的绩效水平有关的报告。

36.如权利要求35所述的制品，其中所述至少一个流动性提供者在所述交易所交易之

前同意所述目标成交率。

37.如权利要求35所述的制品，其中所述存储器存储指令，所述指令在由所述处理器执行时引导所述处理器：

在针对响应的时间段内未从所述至少一个流动性提供者接收到响应。

38.如权利要求35所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

将所述实际成交率与所述目标成交率进行比较以确定绩效水平。

39.如权利要求35所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

确定所述实际成交率未能满足所述目标成交率。

40.如权利要求39所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

响应于所述实际成交率未能满足所述目标成交率，防止任何将来的订单在惩罚时间段期间传送至所述至少一个流动性提供者。

41.如权利要求39所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

确定所述实际成交率在一时间段内未能满足所述目标成交率。

42.如权利要求39所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

传输所述实际成交率未能满足所述目标成交率的指示。

43.如权利要求39所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

向所述至少一个流动性提供者提供提高所述实际成交率的机会。

44.如权利要求35所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

确定所述至少一个流动性提供者触发拒绝阈值量。

45.如权利要求27所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

响应于所述至少一个流动性提供者触发所述拒绝阈值量，防止任何将来的订单在惩罚时间段期间传送至所述至少一个流动性提供者。

46.如权利要求35所述的制品，其中所述交易所在云计算系统上可操作。

47.一种制品，其包括：

有形非暂时计算机可读介质，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

基于目标成交率超过特定百分比来接收至少一个订单以在交易所交易；

传输指示接受或拒绝所述接收的订单的响应；以及

接收与所述交易所的绩效水平有关的报告，其中所述绩效水平是基于比较所述目标成交率与实际成交率。

48.如权利要求47所述的制品，其中所述实际成交率是在每次响应之后更新。

49.如权利要求47所述的制品，其中所述目标成交率是在所述系统上交易之前确定。

50.如权利要求47所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

接收所述实际成交率未能满足所述目标成交率的指示。

51.如权利要求50所述的制品，其中所述有形非暂时计算机可读介质存储指令，所述指令在由处理器执行时引导所述处理器：

响应于所述实际成交率未能满足所述目标成交率，接收将在惩罚时间段内防止传送任何将来的订单的指示。

用于订单的首次曝光匹配的方法、设备和系统

[0001] 相关申请的交叉引用

[0002] 本申请要求2013年11月7日提交的美国专利申请序列号14/074,126的优先权，所述申请特此以引用的方式并入本文。

[0003] 背景

[0004] 交易当事人典型地以他们愿意交易的价格和数量提交证券交易订单。提交订单的当事人通常被称为“流动性接受者(liquidity taker)”，而能够执行订单的当事人通常被称为“流动性提供者”。在某些市场(诸如外汇市场)上，传统上来说交易是通过“二次曝光”来执行。在二次曝光下，流动性接受者提交订单，所述订单被传送至流动性提供者。流动性提供者有一段时间来决定是接受订单(例如，以“完成”响应)还是拒绝订单(例如，以“无或未作”响应)。做决定的这段时间往往会为流动性接受者带来不确定性，尤其是在大量资金与提交的订单绑定的情况下。

[0005] 简要概述

[0006] 各种实施方案是关于基于“首次曝光”过程来匹配流动性接受者与流动性提供者之间的订单。在一些实施方案中，将来自流动性接受者的订单立即与目标成交率(fill rate)高于某一百分比的流动性提供者匹配。

[0007] 附图简述

[0008] 图1描绘了根据本文公开的方法的至少一个实施方案的系统。

[0009] 图2描绘了根据本文公开的方法的至少一个实施方案的流程图。

[0010] 图3描绘了根据本文公开的方法的至少一个实施方案的流程图。

[0011] 图4描绘了根据本文公开的方法的至少一个实施方案的流程图。

[0012] 详细说明

[0013] 以下章节I-XI提供了解释本申请的指南。

[0014] 1.术语

[0015] 除非另外明确指明，否则术语“产品”意指机器、制造品和/或物质组合物。除非另外明确指明，否则术语“过程”意指过程、算法、方法等等。

[0016] 每个过程(无论是称为方法、算法还是其他名称)固有地包括一个或多个步骤，并且因此对过程的一个“步骤”或“多个步骤”的所有提及在对过程的单纯描述中，或者在对术语“过程”或类似术语的单纯叙述中都具有固有的前提基础。因此，在权利要求书中对过程的一个“步骤”或“多个步骤”的任何提及都具有充分的前提基础。

[0017] 除非另外明确指明，否则术语“发明”等等意指“本申请中公开的一个或多个发明”。

[0018] 除非另外明确指明，否则术语“一实施方案”、“实施方案”、“多个实施方案”、“所述实施方案”、“所述多个实施方案”、“一个或多个实施方案”、“一些实施方案”、“某些实施方案”、“一个实施方案”、“另一个实施方案”等等意指“本发明的一个或多个(但不是全部)实施方案”。

[0019] 除非另外明确指明，否则术语本发明的“变型”意指本发明的一实施方案。

[0020] 术语“指示”以极其广泛的意义使用。事物的“指示”应理解为包括可以用于确定所述事物的任何事物。

[0021] 事物的指示可以包括识别所述事物的电子消息(例如,通过附着至小部件的序列号识别小部件、通过小部件的一个或多个特征识别小部件)。事物的指示可以包括可以用于计算和/或查找事物的信息(例如,识别小部件为其中一部分的机器的可以用于确定所述小部件的信息)。事物的指示可以指明与所述事物相关的事物(例如,事物的特征、事物的名称、与所述事物相关的事物的名称)。事物的指示可能无法指明与所述事物相关的事物(例如,字母“a”可以指示计算机系统中被配置来解释字母“a”以识别小部件的小部件)。事物的指示可以包括事物的标志、符号和/或标记。指示例如可以包括代码、参考物、实例、链接、信号和/或识别符。事物的指示可以包括表示、描述和/或以其他方式与所述事物相关联的信息。

[0022] 事物的指示的变换形式可以指示事物(例如,事物的加密指示可以指示事物)。事物的指示可以包括事物自身、事物的拷贝和/或事物的一部分。事物的指示对于未被配置来理解所述指示的事物而言可能是没有意义的(例如,个人可能无法理解字母“a”指示小部件,但是所述字母可以指示小部件,因为计算机系统可以从字母“a”确定所述小部件)。应理解,事物的指示可以用于确定所述事物的事实并不意指所述事物或任何其他事物都能被确定。除非另外指明,否则事物的指示可以包括任何数目事物的指示。事物的指示可以包括其他事物的指示(例如,指示许多事物的电子消息)。(指示在权利要求语言中可以用作非常宽泛的术语。例如:接收金融票据的指示。)

[0023] 术语“表示”意指(1)用于像单词、符号等等一样表达、标明、代表或指示;(2)通过某一术语、字符、符号等等来表达或标明;(3)像图片一样描画或描绘或呈现可能性;或者(4)用作标志或符号。

[0024] 除非另外明确指明,否则在描述实施方案时对“另一个实施方案”的提及并不暗示所提及的实施方案与另一个实施方案(例如,在所提及实施方案之前描述的实施方案)不相容。类似地,提及两个(或更多个)实施方案的单一事实并不暗示这些实施方案是不相容的。

[0025] 本发明的一个实施方案可以包括或覆盖或包含本发明的多于一个的其他实施方案。例如,包含元素a、b和c的第一实施方案可以覆盖包含元素a、b、c和d的第二实施方案以及覆盖元素a、b、c和e的第三实施方案。类似地,第一实施方案、第二实施方案和第三实施方案中的每一个可以覆盖包含元素a、b、c、d以及e的第四实施方案。

[0026] 除非另外明确指明,否则术语“包括”、“包含”及其变型意指“包括但不必限于”。因此,例如,句子“机器包括红色小部件和蓝色小部件”意指所述机器包括红色小部件和蓝色小部件,但是可能同样包括一个或多个其他物品。

[0027] 除非另外明确指明,否则术语“由.....组成”及其变型意指“包括且还限于”。因此,例如,句子“机器由红色小部件和蓝色小部件组成”意指所述机器包括红色小部件和蓝色小部件,但是不包括任何其他事物。

[0028] 除非另外明确指明,否则术语“构成”及其变型意指“构成组成部分、组件或构件”。因此,例如,句子“红色小部件和蓝色小部件构成机器”意指所述机器包括红色小部件和蓝色小部件。

[0029] 除非另外明确指明,否则术语“排他性地构成”及其变型意指“排他性地构成组成

部分、仅有组件或仅有构件”。因此，例如，句子“红色小部件和蓝色小部件排他性地构成机器”意指所述机器由红色小部件和蓝色小部件(即，以及没有任何其他事物)组成。

[0030] 除非另外明确指明，否则术语“一个”、“一种”和“所述”指代“一个(种)或多个(种)”。因此，例如，除非另外明确指明，否则短语“一个小部件”意指一个或多个小部件。类似地，在叙述短语“一个小部件”之后，随后对短语“所述小部件”的叙述意指“所述一个或多个小部件”。因此，应理解，单词“所述”还可以指代具有前提基础的特定术语。例如，如果段落提及“一个特定单一特征”并且之后提及“所述特征”，那么短语“所述特征”应被理解为指代先前提及的“一个特定单一特征”。(应理解，“一个特定单一特征”中的术语“一个(a)”指代“一个(one)”特定单一特征，而不是“一个或多个”特定单一特征。)

[0031] 除非另外明确指明，否则术语“多个”意指“两个或更多个”。

[0032] 除非另外明确指明，否则术语“在本文中”意指“在包括可以引用的方式并入的任何事物的本申请中”。

[0033] 除非另外明确指明，否则短语“至少一个”在这种短语修饰多种事物(诸如一列枚举的事物)时意指这些事物中的一种或两种的任何组合。例如，短语“小部件、车厢和轮子中的至少一个”意指(i)小部件，(ii)车厢，(iii)轮子，(iv)小部件和车厢，(v)小部件和轮子，(vi)车厢和轮子，或者(vii)小部件、车厢和轮子。短语“至少一个”在这种短语修饰多种事物时并不意指多种事物中的“每一种的一个”。例如，短语“小部件、车厢和轮子中的至少一个”并不意指“一个小部件、一个车厢和一个轮子”。

[0034] 数字术语诸如“一个”、“两个”等在用作基数来指示某物的数量(例如，一个小部件、两个小部件)时意指由所述数字术语指示的数量，而不意指由所述数字术语指示的至少所述数量。例如，短语“一个小部件”并不意指“至少一个小部件”，并且因此短语“一个小部件”不覆盖例如两个小部件。

[0035] 除非另外明确指明，否则短语“基于”并不意指“仅基于”。换言之，短语“基于”覆盖“仅基于”和“至少基于”两者。短语“至少基于”等同于短语“至少部分基于”。例如，短语“元素A是基于元素B和元素C来计算”覆盖元素A被计算为B乘以C的乘积(换言之，A＝B x C)的实施方案；A被计算为B加C的总和(换言之，A＝B+C)的实施方案；A被计算为B乘以C乘以D的乘积的实施方案；A被计算为B加C的平方根加D乘以E的总和的实施方案等等。

[0036] 除非另外明确指明，否则术语“表示”和类似术语不是排他性的。例如，除非另外明确指明，否则术语“表示”并不意指“仅表示”。例如，短语“表示信用卡卡号的数据”覆盖“仅表示信用卡卡号的数据”和“表示信用卡卡号的数据和还表示一些其他事物的数据”两者。

[0037] 术语“借此”在本文中仅用于放在从句或其他组单词之前，所述从句或其他组单词仅表达在术语“借此”之前明确叙述的某物的预期结果、目的或结论。因此，当术语“借此”用在权利要求书中时，由术语“借此”修饰的从句或其他单词并不产生对权利要求书的特定的另外限制或以其他方式限制权利要求书的含义或范围。

[0038] 术语“例如”、“诸如”和类似术语意指“举例来说”，并且因此不限制其所解释的术语或短语。例如，在句子“计算机在因特网上发送数据(例如，指令、数据结构)”中，术语“例如”解释“指令”是计算机可以在因特网上发送的“数据”的实例，并且还解释“数据结构”是计算机可以在因特网上发送的“数据”的实例。然而，“指令”和“数据结构”两者仅是“数据”的实例，并且除了“指令”和“数据结构”之外的其他事物也可以是“数据”。

[0039] 术语“相应的”和类似术语意指“个别取出的”。因此，如果两种或更多种事物具有“相应的”特征，那么每个这种事物具有其自身的特征，并且这些特征可以彼此不同，但是这不是必需的。例如，短语“两个机器中的每一个具有相应的功能”意指两个机器中的第一机器具有功能，并且两个机器中的第二机器同样具有功能。第一机器的功能可以与第二机器的功能相同或不相同。

[0040] 术语“即”和类似术语意指“也就是说”，并且因此不限制其所解释的术语或短语。例如，在句子“计算机在因特网上发送数据(即，指令)”中，术语“即”解释“指令”是计算机在因特网上发送的“数据”。

[0041] 除非另外明确指明，否则数字范围包括范围内的整数和非整数。例如，范围“1至10”包括从1至10的整数(例如，1、2、3、4、...9、10)和非整数(例如，1.0031415926、1.1、1.2、...1.9)。

[0042] 在两个或更多个术语或短语同义的(例如，归因于术语或短语是同义的明确陈述)情况下，一个这种术语或短语的例子并不意指另一个这种术语或短语的例子必须具有不同的含义。例如，在陈述提供“包括”的含义与“包括但不限于”同义的情况下，短语“包括但不限于”的单纯使用并不意指术语“包括”意指除了“包括但不限于”之外的某物。

[0043] 2.确定

[0044] 术语“确定”及其语法变型(例如，确定价格、确定值、确定满足某一标准的物体)以极其广泛的意义使用。术语“确定”涵盖各种各样的动作并且因此“确定”可以包括计算(calculating)、计算(computing)、处理、导出、调查、查找(例如，在表、数据库或另一个数据结构中查找)、转化成电子格式或数字表示、查明等等。而且，“确定”可以包括接收(例如，接收信息)、评定(例如，评定存储器中的数据)等等。另外，“确定”可以包括解决、选择、选定、建立等等。

[0045] 术语“确定”并不暗示必然或绝对精确，并且因此“确定”可以包括估测、推断、预测、猜测、求平均值等等。

[0046] 术语“确定”不暗示必须执行数学处理，同时也不暗示必须使用数字方法，并且不暗示使用算法。

[0047] 术语“确定”并不暗示必须使用任何特定装置。例如，计算机不一定需要执行确定。

[0048] 术语“确定”可以包括“计算”。术语“计算”应被理解为包括执行一次或多次计算。计算可以包括计算、处理和/或导出。计算可以通过计算装置来执行。例如，计算事物可以包括通过计算机处理器将算法应用于数据并且产生作为处理器的输出的事物。

[0049] 术语“确定”可以包括“参考”。术语“参考”应被理解为包括例如对事物进行一次或多次参考。参考可以包括查询、评定、选择、选定、读取和/或查找。参考动作可以通过计算装置来执行。例如，对事物进行参考可以包括读取通过处理器将事物存储在其中的存储器位置。

[0050] 术语“确定”可以包括“接收”。例如，接收事物可以包括接受事物。在一些实施方案中，接收可以包括执行来接受事物的动作，诸如操作接收事物所凭借的网络接口。在一些实施方案中，接收可以在不存在执行来接受事物的动作的情况下执行，诸如在直接写存储器或硬连线电路中执行。接收事物可以包括从可能已经对事物作出计算的远程源接收事物。

[0051] 3.句子形式

[0052] 在第一权利要求的限制将覆盖一个特征以及多于一个特征(例如,限制诸如“至少一个小部件”覆盖一个小部件以及多于一个小部件)的情况下,并且在取决于第一权利要求的第二权利要求中,第二权利要求使用定冠词“所述”来指代所述限制(例如,“所述小部件”)的情况下,这种单纯使用并不暗示第一权利要求覆盖仅一个特征,并且这也不暗示第二权利要求覆盖仅一个特征(例如,“所述小部件”可以覆盖一个小部件和多于一个小部件两者)。

[0053] 当序数(诸如“第一”、“第二”、“第三”等等)用作术语之前的形容词时,所述序数仅用于(除非另外明确指明)指示特定特征,诸如将所述特定特征与由相同术语或由相似术语描述的另一个特征区分开来,但是所述序数并不具有任何其他含义或限制作用-它只是方便使用的名称。例如,“第一小部件”可以仅仅如此命名以将其与例如“第二小部件”区分开来。因此,序数“第一”和“第二”在术语“小部件”之前的单纯使用并不指示两个小部件之间的任何其他关系,并且类似地也不指示任一个或两个小部件的任何其他特征。例如,序数“第一”和“第二”在术语“小部件”之前的单纯使用(1)不指示任一个小部件在顺序或位置上处在任何其他小部件之前或之后;(2)不指示任一个小部件在时间上比任何其他小部件早或晚出现或采取动作;以及(3)不指示任一个小部件在重要性或品质方面排在任何其他小部件之前或之后。序数的单纯使用并不限定对用序数识别的特征的数字限制。例如,序数“第一”和“第二”在术语“小部件”之前的单纯使用并不指示正好存在两个小部件。

[0054] 当本文描述单一装置、制品或其他产品时,在另一个实施方案中,多于一个装置或制品(无论它们是否合作)可以可替代地用来取代所描述的单一装置或制品。因此,描述成由一个装置拥有的功能性在另一个实施方案中可以可替代地由多于一个装置或制品(无论它们是否合作)拥有。

[0055] 类似地,当本文描述多于一个装置、制品或其他产品(无论它们是否合作)时,在另一个实施方案中,单一装置或制品可以可替代地用来取代所描述的多于一个装置或制品。例如,多个基于计算机的装置可以用单一基于计算机的装置来取代。在一些实施方案中,这多个基于计算机的装置可以一起操作来执行过程的一个步骤,这在网格计算系统中是常见的。在一些实施方案中,这多个基于计算机的装置可以操作来向彼此提供增加的功能性,以使得所述多个基于计算机的装置可以操作来执行过程的一个步骤,这在云计算系统中是常见的。(相反,单一基于计算机的装置可以用多个彼此合作操作的基于计算机的装置取代。例如,单一计算装置可以用彼此通过因特网通信的服务器和工作站取代。)因此,描述成由多于一个装置或制品拥有的各种功能性可以可替代地由单一装置或制品拥有。

[0056] 所描述的单一装置的功能性和/或特征在另一个实施方案中可以可替代地由一个或多个其他装置体现,所述一个或多个其他装置被描述但是未明确描述成具有这类功能性或特征。因此,其他实施方案不需要包括描述的装置本身,而是可以包括将在那些其他实施方案中具有这类功能性或特征的一个或多个其他装置。

[0057] 4.公开的实例和术语不具有限制性

[0058] 标题(在本申请的第一页开始时阐述)或摘要(在本申请结束时阐述)都不应视为以任何方式限制所公开的发明的范围,而是用于解释任何权利要求的含义或用于限制任何权利要求的范围。仅仅因为摘要是根据37C.F.R.§1.72(b)而被要求的,摘要已被包括在本申请中。

[0059] 本申请中提供的章节的标题仅是为了方便，并且不应视为以任何方式限制本公开。

[0060] 本申请中描述了众多实施方案，并且所述众多实施方案仅出于说明性目的而呈现。所描述的实施方案不具有且不意在具有任何意义上的限制。所公开的发明可广泛适用于众多实施方案，如从本公开容易显而易见的。本领域普通技术人员将认识到所公开的发明可以用各种修改和改变(诸如结构、逻辑、软件和电修改)来实践。虽然可以参考一个或多个特定实施方案和/或附图来描述所公开的发明的具体特征，但是应理解除非另外明确指明，否则这类特征不限于描述所述特征所参考的一个或多个特定实施方案或附图中的使用。

[0061] 虽然实施方案可以被公开为包括若干特征，但是本发明的其他实施方案可以包括少于所有这类特征的特征。因此，例如，权利要求书可以涉及少于所公开的实施方案中的整组特征的特征，并且这种权利要求书不会被解释为要求超过权利要求明确叙述的那些特征的特征。

[0062] 本申请中描述的方法步骤或产品元素的实施方案不构成本文要求保护的发明，或对于本文要求保护的发明而言不是必要的，或者不与本文要求保护的发明共扩展，例外的是在本说明书中明确如此陈述或在所述权利要求书中(相对于权利要求书和由所述权利要求书限定的发明)明确叙述。

[0063] 权利要求中叙述除了法定类别之外的任何事物的任何前序应被解释为叙述所要求保护的发明的目的、益处和可能的用途，并且这类前序不应被视为限制所要求保护的发明。

[0064] 本公开并不是本发明的所有实施方案的文字描述。另外，本公开不是本发明中必须存在于所有实施方案中的特征的列表。

[0065] 权利要求(甚至包括所有未决的、修订的、公布的和取消的权利要求)不必覆盖所有公开的实施方案。此外，公开的实施方案可以(但不一定需要)由若干权利要求覆盖。因此，在一项权利要求(无论是未决的、修订的、公布的还是取消的)涉及特定实施方案的情况下，这并不是其他权利要求的范围也不覆盖所述实施方案的证据。

[0066] 除非另外明确指明，否则描述成彼此通信的装置彼此不需要持续通信。相反，这类装置仅在必要或合乎需要的情况下需要彼此传输，并且实际上可能在大多数时间内会制止交换数据。例如，通过因特网与另一个机器通信的机器可能在一段较长时间(例如，有时是数周)内都不会向另一个机器传输数据。此外，彼此通信的装置可以直接地或间接地通过一个或多个中间渠道来通信。装置在它们彼此能够至少单向通信的情况下就可彼此通信。例如，第一装置在所述第一装置能够向第二装置传输信息的情况下就可与所述第二装置通信。类似地，第二装置在所述第二装置能够从第一装置接收信息的情况下就可与所述第一装置通信。

[0067] 对实施方案的若干组件或特征的描述并不暗示这类组件或特征的所有或甚至任何描述都是需要的。相反，将描述各种任选组件来说明本发明的各种各样的可能的实施方案。除非另外明确指明，否则没有组件或特征是必要的或需要的。

[0068] 虽然可能以特定顺序描述或主张过程步骤、算法等等，但是这类过程可以被配置来以不同的次序工作。换言之，可能明确描述或主张的步骤的任何顺序或次序不一定指示

所述步骤按所述次序执行的要求。本文描述的过程的步骤可以任何可能的次序执行。另外，一些步骤可以同时执行，但是被描述或暗示成是非同时发生的(例如，因为一个步骤是在另一个步骤之后描述的)。此外，过程通过附图中对其的描绘而进行的说明不暗示说明的过程排除对其作出的其他变化和修改，不暗示说明的过程或其任何步骤对本发明而言是必要的，并且不暗示说明的过程是优选的。

[0069] 虽然过程可以被描述成包括多个步骤，但是这并不暗示所有或任何步骤都是优选的、必要的或需要的。所描述的本发明的范围内的各种其他实施方案包括省略所描述步骤中的一些或全部的其他过程。除非另外明确指明，否则没有步骤是必要的或需要的。

[0070] 虽然可以单独地或在不参考其他产品或方法的情况下描述过程，但是在一个实施方案中，所述过程可以与其他产品或方法交互。例如，这类交互可以包括将一个商业模式与另一个商业模式联系起来。这类交互可以被提供来增强过程的灵活性或合意性。

[0071] 虽然产品可以被描述成包括多个组件、方面、品质、特征和/或特性，但是这并不指示任何或所有所述多个都是优选的、必要的或需要的。所描述的本发明的范围内的各种其他实施方案包括省略所描述多个中的一些或全部的其他产品。

[0072] 除非另外明确指明，否则一列枚举的物品(其可以是编号或不编号的)并不暗示任何或所有物品都是不相容的。类似地，除非另外明确指明，否则一列枚举的物品(其可以是编号或不编号的)并不暗示任何或所有物品包含任何类别。例如，枚举的列表“计算机、膝上型计算机和PDA”不暗示所述列表中三项物品中的任一个或全部都是不相容的，并且不暗示所述列表中三项物品中的任一个或全部都包含任何类别。

[0073] 一列枚举的物品(其可以是编号或不编号的)并不暗示任何或所有物品都彼此等同或容易彼此取代。

[0074] 所有实施方案都是说明性的，并且不暗示本发明或任何实施方案都已形成或执行，这要视情况而定。

[0075] 5.计算

[0076] 对于本领域普通技术人员而言将容易显而易见的是，本文描述的各种过程可以通过例如适当编程的通用计算机、专用计算机和计算装置来实施。典型地，处理器(例如，一个或多个微处理器、一个或多个微控制器、一个或多个数字信号处理器)将(从存储器或类似装置)接收指令，并且执行这些指令，从而执行由这些指令限定的一个或多个过程。指令可以体现在例如一个或多个计算机程序、一个或多个脚本中。

[0077] 术语“计算”应是指根据软件算法使用处理器来确定。

[0078] “处理器”意指一个或多个微处理器、中央处理单元(CPU)、计算装置、微控制器、数字信号处理器、图形处理单元(GPU)或类似装置或其任何组合，而不管架构(例如，芯片级多重处理或多核、RISC、CISC、无互锁流水线级的微处理器、流水线配置、同时多线程、具有集成图形处理单元的微处理器GPGPU)如何。

[0079] “计算装置”意指一个或多个微处理器、中央处理单元(CPU)、计算装置、微控制器、数字信号处理器、图形卡、移动游戏装置或类似装置或其任何组合，而不管架构(例如，芯片级多重处理或多核、RISC、CISC、无互锁流水线级的微处理器、流水线配置、同时多线程)如何。

[0080] 因此，过程的描述类似地是用于执行所述过程的设备的描述。执行所述过程的设

备可以包括例如处理器和对于执行所述过程而言适当的那些输入装置和输出装置。例如，过程的描述是包括处理器和存储器的设备的描述，所述存储器存储包含指令的程序，所述指令在由处理器执行时引导所述处理器执行方法。

[0081] 执行所述过程的设备可以包括一起工作来执行所述过程的多个计算装置。计算装置中的一些可以一起工作来执行过程的每个步骤，可以在过程的单独步骤内工作，可以向其他计算装置提供可以促进所述过程的执行的基本服务。这类计算装置可以在集中式授权机构的指令下采取动作。在另一个实施方案中，这类计算装置可以在不存在集中式授权机构的指令的情况下采取动作。可以这些方式中的一些或全部操作的设备的一些实例可以包括网格计算机系统、云计算机系统、对等计算机系统、被配置来提供软件即服务的计算机系统等等。例如，所述设备可以包括计算机系统，所述计算机系统在远程服务器上执行其大部分处理负载，但向本地用户计算机输出显示信息并且从其接收用户输入信息，诸如执行VMware软件的计算机系统。

[0082] 另外，实施这类方法(以及其他类型数据)的程序可以使用各种介质(例如，计算机可读介质)以多种方式来存储和传输。在一些实施方案中，硬连线电路或定制硬件可以用来取代可以实施各种实施方案的过程的软件指令中的一些或全部或与其组合。因此，硬件和软件的各种组合可以用来取代仅有的软件。

[0083] 术语“计算机可读介质”指代任何非暂时介质、多个所述非暂时介质、或参与提供可以由计算机、处理器或类似装置读取的数据(例如，指令、数据结构)的不同介质的组合。这种介质可以采取许多形式，包括但不限于非易失性介质、易失性介质和传输介质。非易失性介质包括例如光盘或磁盘和其他持久性存储器。易失性介质包括动态随机存取存储器(DRAM)，其典型地构成主存储器。传输介质包括同轴缆线、铜线和光纤，包括包含耦合至处理器的系统总线的导线。传输介质可以包括或传送声波、光波和电磁发射，诸如在射频(RF)和红外线(IR)数据通信期间产生的那些。计算机可读介质的常见形式包括例如软盘、软磁盘、硬盘、磁带、任何其他磁性介质、CD-ROM、DVD、任何其他光学介质、穿孔卡、纸带、任何其他具有孔形图案的物理介质、RAM、PROM、EPROM、FLASH-EEPROM、任何其他存储器芯片或盒式磁带、下文描述的载波、或任何其他计算可以读取的介质。

[0084] 术语“有形计算机可读介质”指代包括硬件组件，诸如光盘或磁盘的“计算机可读介质”。

[0085] 各种形式的计算机可读介质可以参与将数据(例如，指令序列)传送至处理器。例如，数据可以(i)从RAM传递至处理器；(ii)经由无线传输介质传送；(iii)根据众多格式，标准或协议诸如以太网(或IEEE802.3)、由IEEE 802.11规范限定的无线局域网通信(无论它们是否被WiFi联盟、SAP、ATP、BluetoothTM和TCP/IP认可)，TDMA，CDMA以及3G来格式化和/或传输；和/或(iv)加密来确保隐私或防止本领域中熟知的各种方式中任一种方式的诈骗。

[0086] 术语“数据库”指代以可检索格式存储的数据的任何电子存储集合。

[0087] 术语“数据结构”指代硬件机器诸如计算机中的数据库。

[0088] 术语“网络”意指通过通信路径互连的一系列点或节点。例如，网络可以包括通过一个或多个有线和/或无线通信路径互连的多个计算机或通信装置。网络可以与其他网络互连并且含有子网络。

[0089] 术语“预定的”意指事先例如在当前时间或当前动作之前确定的。例如，短语“显示

预定值”意指显示在显示动作之前确定的值。

[0090] 术语“条件”意指(1)达成一致所依据的前提,或(2)对于其他事物的出现或发生而言必要的某物。

[0091] 术语“交易”意指(1)商品、服务或资金的交换或转移,或(2)涉及彼此相互地作用或影响的两位当事人或两件事的交往行为或活动。

[0092] 因此,过程的描述类似地是存储用于执行所述过程的程序的计算机可读介质的描述。计算机可读介质可以存储(以任何适当的格式)对于执行方法而言适当的那些程序单元。例如,过程的描述是存储程序的计算机可读存储介质的描述,所述程序包含指令,所述指令在由处理器执行时引导所述处理器执行所述方法。

[0093] 正如过程中的各种步骤的描述并不指示所有描述步骤是需要的一样,设备的实施方案包括可操作来执行所描述过程的一些(但不需要是全部)的计算机或计算装置。

[0094] 类似地,正如过程中的各种步骤的描述并不指示所有描述步骤是需要的一样,存储程序或数据结构的计算机可读介质的实施方案包括存储程序的计算机可读介质,所述程序在执行时可以致使处理器执行所描述过程的一些(但不需要是全部)。

[0095] 在描述数据库的情况下,本领域普通技术人员将理解(i)可以容易地采用所描述的那些的替代的数据库结构,并且(ii)可以容易地采用除了数据库之外的其他存储结构。本文呈现的任何抽样数据库的任何说明或描述是信息的存储表示的说明性布置。可以采用除了由例如附图中示出的表或其他地方提出的那些之外的任何数目的其他布置。类似地,数据库的任何说明的条目仅表示示例性信息;本领域普通技术人员将理解,所述条目的数目和内容可以与本文描述的那些不同。另外,虽然存在数据库作为表的任何描绘,但是(包括相关的数据库、基于对象的模型和/或分布的数据库)的其他格式可以用于存储和操纵本文描述的数据类型。类似地,数据库的对象方法或行为可以用于实施诸如本文所描述的各种过程。此外,数据库可以已知的方式在本地或相对于访问这个数据库中的数据的装置远程地存储。

[0096] 各种实施方案可以被配置来在网络环境中起作用,所述网络环境包括与一个或多个装置通信(例如,通过通信网络)的计算机。计算机可以直接地或间接地通过任何有线或无线介质(例如,因特网、LAN、WAN或以太网、令牌环、电话线、缆线、无线电信道、光通信线路、商业在线服务提供者、公告板系统、卫星通信链路、上述情况的任何组合)来与装置通信。装置中的每一个自身可以包括计算机或适于与计算机通信的其他计算装置,诸如基于Intel®、Pentium®、或Centrino™、Atom™或Core™处理器的那些。任何数目和类型的装置可以与计算机通信。

[0097] 在一个实施方案中,服务器计算机或集中式授权机构可能不是必要的或合乎需要的。例如,本发明在一个实施方案中可以在不存在中心机构的情况下在一个或多个装置上实践。在这样一个实施方案中,在本文中描述成由服务器计算机执行的任何功能或描述成存储在服务器计算机上的数据可以替代地由一个或多个这类装置执行或存储在所述一个或多个这类装置上。

[0098] 在描述过程时,在一个实施方案中,所述过程可以在没有任何用户干预的情况下操作。在另一个实施方案中,所述过程包括一些人工干预(例如,步骤由人执行或借助于人来执行)。

[0099] 如本文所使用，术语“加密”指代以下过程：遮蔽或隐藏信息，以使得在不具有专门知识的情况下无法容易地理解信息。加密过程可以将原始信息(称为明文)转换为加密信息。加密信息可以被称为密文，并且用于将明文转换为密文的算法可以被称为密码。密码还可以用于执行将密文转回到明文的反向操作。密码的实例包括替代密码、变位密码和使用转子机实施的密码。

[0100] 在各种加密方法中，密码可能要求称为密钥的补充信息片。密钥可以例如由一串字节组成。密钥可以与用于对明文加密的密码结合使用。密钥也可以与用于对密文加密的密码结合使用。在称为对称密钥算法的密码的类别(例如，私钥密码)中，相同的密钥用于加密和解密两者。加密信息的不可侵犯性因此可以取决于保密的密钥。对称密钥算法的实例是DES和AES。在称为非对称密钥算法的密码的类别(例如，公钥密码)中，不同的密钥用于加密和解密两者。在非对称密钥算法的情况下，任何公众成员都可以使用第一密钥(例如，公钥)来将明文加密为密文。然而，只有第二密钥(例如，私钥)的持有者才能够将密文解密回到明文。非对称密钥算法的实例是RSA算法。

[0101] 6.继续申请

[0102] 本公开向本领域普通技术人员提供了实现若干实施方案和/或发明的描述。本申请中可能未主张这些实施方案和/或发明中的一些，但是却可能在要求本申请的优先权的权益的一个或多个继续申请中得到主张。

[0103] 申请人意在提交另外的申请来追加已经公开和实现但未在本申请中主张的主题的专利。

[0104] 7. 35U.S.C.§112的第6段

[0105] 在权利要求书中，对权利要求书的包括短语“用于.....装置”或短语“用于.....的步骤”的限制意指35U.S.C.§112的第6段适用于所述限制。

[0106] 在权利要求书中，对权利要求书的不包括短语“用于.....的装置”或短语“用于.....的步骤”的限制意指35U.S.C.§112的第6段不适用于所述限制，而不管所述限制是否是在未叙述用于执行所述功能的结构、材料或动作的情况下叙述功能。例如，在权利要求书中，在提及权利要求或另一项权利要求中的一个或多个步骤时短语“.....的一个步骤”或短语“.....的多个步骤”的单纯使用并不意指35U.S.C.§112的第6段适用于所述步骤。

[0107] 对于用于根据35U.S.C.§112的第6段执行指定功能的装置或步骤，本说明书及其等效形式中描述的对应的结构、材料或动作可以执行另外的功能以及指定功能。

[0108] 计算机、处理器、计算装置和类似产品是可以执行各种各样功能的结构。这类产品可以操作来通过执行一个或多个程序来执行指定功能，所述一个或多个程序诸如存储在所述产品的存储器装置中或所述产品访问的存储器装置中的程序。除非另外明确指明，否则这种程序不需要基于任何特定算法，诸如本申请中可能公开的任何特定算法。本领域普通技术人员熟知的是，指定功能可以通过不同算法来实施，并且许多不同算法中的任一个将是用于执行指定功能的单纯的设计选择。

[0109] 因此，对于用于根据35U.S.C.§112的第6段执行指定功能的装置或步骤，对应于指定功能的结构包括编程来执行指定功能的任何产品。这种结构包括执行功能的编程产品，而不管这种产品是用(i)用于执行所述功能的公开算法，(ii)与公开算法类似的算法来编程，还是用(iii)用于执行所述功能的不同算法来编程。

[0110] 在叙述了用于执行为方法的功能的装置的情况下，用于执行这种方法的一个结构包括计算装置(例如，通用计算机)，所述计算装置被编程和/或配置有适当的硬件以执行所述功能。

[0111] 还包括被编程和/或配置有适当的硬件以通过如本领域普通技术人员将理解的其他算法来执行所述功能的计算装置(例如，通用计算机)。

[0112] 8.放弃权利要求

[0113] 对特定实施方案的频繁提及并不指示放弃或否认另外的不同实施方案，并且对全部包括特定特征的实施方案的描述的类似提及并不指示放弃或否认不包括所述特定特征的实施方案。本申请中的明确放弃或否认将前加短语“不包括”或短语“无法执行”。

[0114] 9.以引用方式并入

[0115] 本文提及的任何专利、专利申请或其他文件以引用的方式并入到本专利申请中作为本公开的部分，但是仅出于根据35U.S.C.§112的第1段来书面撰写和实现的目的，并且绝不应当用于限制、限定或以其他方式解释本申请的任何术语，除非在不存在这种以引用方式进行的并入的情况下，否则本领域普通技术人员尚无法确定一般含义。本领域普通技术人员不需要以任何方式受限于参考文献中提供的任何实施方案。相反地，本申请中提供的定义不应用于限制、限定或以其他方式解释以引用的方式并入本文的任何文件的任何术语。尽管特定实施方案的描述可能与所述定义不相容，但是本申请中明确阐述的定义占主导地位。

[0116] 除非本专利申请中另外明确指明，否则以引用方式进行的任何并入就其自身而言并不暗示对任何并入专利、专利申请或其他文件中含有的任何陈述、观点、争议或表征的任何承认、认可或默许。

[0117] 10.审批过程(Prosecution History)

[0118] 在解释本申请(其包括权利要求)时，本领域普通技术人员提及本申请的审批过程，但是不是任何其他专利或专利申请的审批过程，而不管是否存在被认为与本申请相关的其他专利申请，并且不管是否存在与本申请共享优先权要求的其他专利申请。

[0119] 示例性实施方式的详细说明

[0120] 各种实施方案是关于一种用于在系统上匹配流动性接受者与流动性提供者之间的订单的方法、设备和系统。存储器存储指令，所述指令在执行时引导至少一个处理器来执行诸如以下的各种动作。处理器可以从流动性接受者接收订单以在交易所交易。订单传送至目标成交率超过特定百分比的至少一个流动性提供者。从至少一个流动性提供者接收响应。所述响应可以指示接受或拒绝订单。基于接收的响应，处理器可以更新至少一个流动性提供者的实际成交率。处理器可以基于比较至少一个流动性提供者的实际成交率与目标成交率来确定至少一个流动性提供者的绩效水平(level of performance)。处理器可以传输与至少一个流动性提供者的绩效水平有关的报告。

[0121] 在一些实施方案中，交易所包括电子交易系统。交易所还可以包括以下各项中的至少一项：外汇交易所、场外交易(OTC)市场、拍卖式交易所以及屏幕式交易所。至少一个流动性提供者可以在交易所交易之前同意目标成交率。至少一个流动性提供者可以在交易所交易之前同意目标成交率的特定百分比。在一些实施方案中，交易所在云计算系统上可操作。

[0122] 在一些实施方案中，至少一个流动性提供者以拒绝订单响应，其中拒绝包括对订单的明确驳回。在其他实施方案中，拒绝包括至少一个流动性提供者在响应时间段内不提供响应。

[0123] 在一些实施方案中，处理器可以通过比较实际成交率与目标成交率以确定绩效水平来确定至少一个流动性提供者的所述绩效水平。处理器可以确定实际成交率未能满足目标成交率。实际成交率可能在一时间段内未能满足目标成交率。可以向至少一个流动性提供者传输实际成交率未能满足目标成交率的指示。

[0124] 在一些实施方案中，响应于实际成交率未能满足目标成交率，处理器可以防止任何将来的订单在惩罚时间段期间传送至所述至少一个流动性提供者。可以在系统上交易之前商定惩罚期。

[0125] 在一些实施方案中，处理器向至少一个流动性提供者提供提高实际成交率的机会。可以在一时间段内提供提高机会。如果在用于提高的时间段结束时，实际成交率仍然低于目标成交率，那么将在惩罚时间段内防止至少一个流动性提供者接收订单。

[0126] 在一些实施方案中，处理器可以确定至少一个流动性提供者触发拒绝阈值量。可以向流动性提供者传输实际成交率未能满足目标成交率的指示。响应于至少一个流动性提供者触发拒绝阈值量，处理器可以防止任何将来的订单在惩罚时间段期间传送至所述流动性提供者。在一些实施方案中，处理器向至少一个流动性提供者提供提高实际成交率的机会。可以在一时间段内提供提高机会。如果在用于提高的时间段结束时，实际成交率仍然低于目标成交率，那么将在惩罚时间段内防止至少一个流动性提供者接收订单。

[0127] 各种实施方案是关于一种用于在交易所匹配流动性接受者与流动性提供者之间的订单的方法、设备和系统。存储器存储指令，所述指令在执行时引导至少一个处理器来执行诸如以下的各种动作。处理器可以基于目标成交率超过特定百分比来接收至少一个订单以在交易所交易。可以传输指示接受或拒绝所接收的订单的响应。接收与交易所的绩效水平有关的报告。绩效水平是基于比较目标成交率与实际成交率。

[0128] 在一些实施方案中，在每次响应之后更新实际成交率。可以在系统上交易之前确定目标成交率。

[0129] 在一些实施方案中，接收所述实际成交率未能满足所述目标成交率的指示。响应于实际成交率未能满足目标成交率，处理器可以接收将在惩罚时间段内防止传送任何将来的订单的指示。

[0130] 在一些实施方案中，已触发拒绝阈值量的指示。响应于拒绝阈值量被触发，接收将在惩罚时间段内防止传送任何将来的订单的指示。

[0131] 图1.示例性系统

[0132] 本发明的一些实施方案提供用于基于“首次曝光”来匹配流动性接受者与流动性提供者之间的订单的系统和方法。图1描绘了根据本文公开的系统的至少一个实施方案的系统。

[0133] 系统100可以包括耦合至一个或多个数据库80的一个或多个服务器2、一个或多个数据提供者8a-8n、一个或多个终端用户10a-10n以及一个或多个代理12。数据提供者8a-8n、用户10a-10n、代理12和服务器2分别可以彼此通信。用户10a-10n还可以与其他用户10a-10n通信。

[0134] 系统100和服务器2可以执行本文针对外汇交易所、OTC市场、拍卖式交易所、屏幕式交易所或任何金融市场描述的功能。

[0135] 服务器2可以包括一个或多个处理器、计算机、计算机系统、计算机网络和/或计算机数据库。服务器2可以包括模块18-64。服务器2还可以包括一个或多个数据库诸如数据库80。服务器2可以与用户10a-10n、数据提供者8和代理12通信。例如，服务器2可以例如通过因特网与用户10a-10n计算机，诸如用户计算机的浏览器通信。

[0136] 数据库80可以包括一个或多个处理器、计算机、计算机系统、计算机网络和/或被配置来存储信息的计算机数据库。数据库80中的每一个可以例如通过服务器2的一个或多个模块而与服务器2通信。例如，搜索模块可以例如通过因特网搜索一个或多个金融数据库(例如，存储订单或订约方偏好信息的数据库)，以确定满足一个或多个参数(诸如，基于用户的偏好的参数)的一个或多个证券或订单。

[0137] 价格模块18可以确定一个或多个值或价格并且使所述一个或多个值或价格与一个或多个订单、证券、有价证券或例如本文所述的其他金融实体相关联。例如，价格模块18可以确定例如订单或者待支付或者由用户或服务器接收的，例如一个或多个证券的价格。例如，价格模块可以确定实体诸如流动性接受者愿意支付或者流动性提供者愿意卖出特定交易订单的价格或值(诸如，净现值)(例如，针对购买或出售的证券报价的量值)。价格可以包括当前价格、历史价格(例如，诸如先前时间诸如一周前的市场价格的价格)和估计将来价格(例如，基于改变的价格信息，诸如最近的一段时间内价格的最近的增加或降低1。

[0138] 数据库

[0139] 如图1中所示，数据库80可以耦合至服务器2。数据库80可以包括如下所述的多个数据库。数据库80可以存储与用户有关的信息、元素和其他信息。

[0140] 模块可以单独地或以各种组合起作用。虽然模块被示出处于单一服务器内，但是所述模块也可以在若干服务器当中操作。模块可以与多个数据库通信，所述多个数据库也可以共同地或单独地起作用。

[0141] 服务器2的模块可以存储、访问和以其他方式与各种数据源交互，所述各种数据源包括外部数据、数据库和其他输入。

[0142] 示例性方法

[0143] 图2描绘了根据本文公开的方法的至少一个实施方案的流程图。

[0144] 应理解，针对每个方块描述的每个功能可以使用能够执行所述功能的模块，例如根据上文针对每个模块描述的方法来执行。还应认识到，这些方块中描述的动作可以任何次序(包括但不限于流程图上所示的示例性排序)执行，并且不需要执行所有的方块。

[0145] 在方块200，系统100与流动性提供者达成协议。在一些实施方案中，这些协议陈述给定流动性提供者将同意对其接收的买入/卖出订单填补某一百分比。在一些实施方案中，流动性提供者同意在某一时间范围内以接受订单响应(例如，以“完成”响应)。这个时间范围可以是任何时间增量。例如，流动性提供者可以同意在1秒或更少的时间内响应。每个提供者与系统100可以具有不同的协议。

[0146] 在一些实施方案中，若干流动性提供者可以流动式给出相同价格。流动性接受者可以观察市场并且以某一价格和数量提交买入/卖出订单。在一些实施方案中，系统100向所有流动性提供者发送显示市场处于所请求价格的订单。在其他实施方案中，流动性接受

者可以表明希望仅与具有最小目标成交率(例如,高于85%)的流动性提供者匹配。因此,系统100可以过滤掉目标成交率落在所请求目标成交率之下的流动性提供者。在其他实施方案中,系统100可以自动地过滤掉目标成交率落在某一百分比之下的流动性提供者,而不需要流动性接受者作出任何明确请求。例如,系统100可以确定仅目标成交率超过85%的流动性提供者才允许查看所有订单。系统可能具有分层结构,其中流动性提供者基于其目标成交率而被分为某些级别。分配给流动性提供者的级别确定其查看和接收的订单的数量和/或品质。例如,系统100可以具有规定,其中所有订单传送至目标成交率超过90%的流动性提供者。具有更为保守的目标成交率诸如60%的流动性提供者可能不接收所有可获得的订单。因此,流动性提供者有动力来同意更高的目标成交率。目标成交率由流动性提供者在被允许在系统100上交易之前指定。在一些实施方案中,可以提示系统100上所有有希望的流动性提供者在被允许在系统100上交易之前表明目标成交率。

[0147] 在方块205,系统100(例如,服务器2的一个或多个处理器)可以例如按本文所述接收订单。订单可以由流动性接受者提交。订单可以在交易所交易。在一些实施方案中,交易所可以是外汇交易所。在其他实施方案中,交易所可以是场外交易市场。在其他实施方案中,交易所是拍卖式交易所,诸如纽约股票交易所(NYSE)。在另一个实施方案中,交易所是电子屏幕式交易所,诸如NASDAQ,其中买入者和卖出者通过网络连接。在一些实施方案中,交易可在云计算系统上操作。

[0148] 在方块210,处理器可以将所述订单传送至目标成交率超过特定百分比的至少一个流动性提供者。在方块215,处理器可以从流动性提供者接收指示接受或拒绝传送订单的响应。在一些实施方案中,拒绝通过来自流动性提供者的明确驳回来指示。在其他实施方案中,拒绝通过在一段时间内缺乏来自流动性提供者的响应来指示。例如,如果流动性提供者在1分钟内未对传送订单作出响应,那么系统100将响应的缺乏解释为“不接受”。在一些实施方案中,流动性提供者可以“完成”响应,但是所述订单可能与不同的流动性提供者匹配。例如,系统100可以将订单与响应的第一流动性提供者匹配。在这类情况下,尽管未得到订单,但是流动性提供者的“完成”响应仍然正面计入实际成交率。

[0149] 在方块220,处理器可以基于流动性提供者对传送订单给出的响应来更新所述流动性提供者的实际成交率。来自流动性提供者的拒绝不正面计入提供者的实际成交率。类似地,“完成”响应或从流动性提供者接受订单正面计入提供者的实际成交率。例如,如果流动性提供者仅接受五分之三的传送订单,那么系统将流动性提供者计算为具有60%的实际成交率。

[0150] 系统100在预定时间段内计算流动性提供者的实际成交率。在一些实施方案中,系统100在一天当中计算实际成交率。在其他实施方案中,系统100可以在一周、一个月或任何时间增量内计算实际成交率。在一些实施方案中,系统100随着对传送订单的每次响应而动态地更新流动性提供者的实际成交率。

[0151] 在方块225,处理器可以将流动性提供者的实际成交率与原始目标成交率进行比较。在一些实施方案中,从这个比较计算绩效水平。例如,系统100可以确定流动性提供者在实际成交率满足或超出目标成交率的情况下表现良好。相反地,如果实际成交率未能满足目标成交率,那么系统100可以确定较差的绩效水平。

[0152] 在方块230,处理器可以传输与所述流动性提供者的绩效水平有关的报告。在一些

实施方案中，可以按确定的频率诸如每天、每两周、每周、每月或任何其他时间增量定期地发送报告。

[0153] 图3描绘了根据本文公开的方法的至少一个实施方案的流程图。

[0154] 在方块300，处理器可以确定流动性提供者的实际成交率未能满足目标成交率。如上所述，系统100可以在跨越一天、一周、一个月或任何时间增量的时间段内计算实际成交率。在一些实施方案中，系统100比较流动性提供者的实际成交率与目标成交率以确定绩效水平。在其他实施方案中，系统100保持追踪流动性提供者在一段时间内以“不接受”拒绝响应的次数。流动性提供者可以触发拒绝阈值量。例如，如果流动性提供者在一天当中以“不接受”拒绝响应3次，那么系统100可以触发警报。

[0155] 在方块305，处理器可以向流动性提供者发送警告指示。在一些实施方案中，将向流动性提供者给予宽限期以便于提高实际成交率。

[0156] 在宽限期结束时，如方块310中所示，系统100可以重算实际成交率。如果流动性提供者的实际成交率仍然落在目标成交率之下，那么系统100可以使所述流动性提供者离开交易所，如方块315中所示。在一个实施方案中，将防止流动性提供者进行交易直到达到标准为止。在一个实施方案中，所述标准是惩罚时间段期满。在另一个实施方案中，系统100将在惩罚时间段期间不向所述流动性提供者传送任何订单。在其他实施方案中，流动性提供者将无法登录到系统100上。在一些实施方案中，系统100将向流动性提供者发送指示交易特权已因实际成交率落在目标成交率之下而被撤销的通知。在惩罚期结束时，系统100可以向流动性提供者发送指示交易特权已恢复的通知。

[0157] 在方块320，处理器可以从流动性提供者接收改变原始目标成交率的请求。在一些实施方案中，流动性提供者可能希望降低目标成交率。在流动性提供者已被惩罚多次的情况下，系统100可能希望与流动性提供者的代表谈话以执行进一步分析。

[0158] 图4描绘了根据本文公开的方法的至少一个实施方案的流程图。

[0159] 在方块400，远程装置上的流动性提供者可以在系统100上从流动性接受者接收订单。在一些实施方案中，流动性提供者基于订单指示的目标成交率来接收所述订单。例如，流动性提供者可以具有80％的目标成交率，并且流动性接受者要求系统100仅向成交率超过70％的流动性提供者传送其订单。

[0160] 在方块405，流动性提供者可以传输指示接受或拒绝接收的订单的响应。

[0161] 在方块410，流动性提供者接收与其在所述交易所的绩效水平有关的报告。绩效水平是基于比较目标成交率与实际成交率。在一些实施方案中，在每次响应之后更新实际成交率。在一些实施方案中，报告是肯定的，从而指示绩效水平与目标成交率相一致。在其他实施方案中，报告指示不存在提高的空间。报告可能指示绩效水平落在目标成交率之下。

[0162] 在方块415，流动性提供者可以接收绩效水平在指定时间段内落在目标成交率之下的警告。可以向流动性提供者给予机会来在宽限时间段期间提高绩效水平。

[0163] 在方块420，流动性提供者可以接收交易特权因较差的绩效水平而将被暂停的指示。暂停期可以持续惩罚时间段。在惩罚期结束时，如方块425中所示，流动性提供者可以接收交易特权已被恢复的通知。

[0164] 在方块430，流动性提供者可以提交请求以将目标成交率改为不同的目标成交率。

[0165] 云计算

[0166] 事先应理解，虽然本公开包括对云计算的详细描述，但是本文叙述的教义的实施方式并不限于云计算环境。相反，本发明的实施方案能够结合现在已知或将来开发的任何其他类型的计算环境来实施。

[0167] 云计算是用于实现方便地按需通过网络访问可配置计算资源(例如，网络、网络带宽、服务器、处理、存储器、存储体、应用程序、虚拟机以及服务)的共享池的服务传递模型，所述可配置计算资源可以快速调配和发布，同时最小化管理工作或与服务提供商的交互。这个云模型可以包括至少五个特征、至少三个服务模型和至少四个部署模型。

[0168] 1.特征

[0169] 云计算的一些特征如下：

[0170] a.按需自助服务

[0171] 云消费者可以单方面根据需要自动地调配计算功能，诸如服务器时间和网络存储体，而不需要与服务供应商进行人员交互。

[0172] 宽泛的网络访问功能可在网络上获得并且通过标准机构来评定，所述标准机构通过不同种类的瘦或胖客户端平台(例如，移动电话、膝上型计算机和PDA)来推广使用。

[0173] b.资源池化

[0174] 提供者的计算资源被池化来使用多承租人模型来服务于多个消费者，其中不同的物理资源和虚拟资源根据需要动态分配和重新分配。位置无关性的意义在于消费者通常无法控制或不知道所提供的资源的确切位置，但是可能能够以更高的抽象层次指定位置(例如，国家、州、或数据中心)。

[0175] c.快速灵活

[0176] 功能可以快速地且灵活地(在一些情况下自动地)调配以快速实现扩展并且快速地发布以快速快速实现收缩。对于消费者而言，可供用于调配的功能往往看起来似乎是无限的，并且可以在任何时间以任何数量购买。

[0177] d.按次计费服务

[0178] 云系统通过在对于服务类型(例如，存储、处理、带宽以及活动的用户账户)而言适当的某一抽象层次上利用计量功能来自动地控制和优化资源使用。可以监控、控制和报告为所利用的服务的提供者和消费者两者提供透明性的资源使用。

[0179] 2.服务模型

[0180] 各种类型的服务模型如下：

[0181] a.软件即服务(SaaS)

[0182] 提供给消费者的功能是使用提供者运行在云基础设施上的应用程序。可以在各种客户端装置上通过瘦客户端界面诸如网页浏览器(例如，基于网页的电子邮件)来访问应用程序。消费者并不管理或控制底层的云基础设施，包括网络、服务器、操作系统、存储体、或甚至单个应用程序的功能，可能的例外就是用户特定的应用程序配置设定受限。

[0183] b.平台即服务(PaaS)

[0184] 提供给消费者的功能是将消费者使用由提供者支持的编程语言和工具创建的或获得的应用程序部署到云基础设施上。消费者并不管理或控制底层的云基础设施，包括网络、服务器、操作系统、或存储体，但是能够控制部署的应用程序以及可能由应用程序托管的环境配置。

[0185] c.基础设施即服务(IaaS)。

[0186] 提供给消费者的功能是调配处理、存储、网络以及其他基础计算资源，在此情况下，消费者能够部署和运行任意软件，所述任意软件可以包括操作系统和应用程序。消费者并不管理或控制底层的云基础设施，但是能够控制操作系统、存储体、部署的应用程序，并且可能对选择网络组件(例如，主机防火墙)进行有限的控制。

[0187] 3.部署方法

[0188] 各种类型的部署模型包括：

[0189] a.私有云。

[0190] 云基础设施仅为组织操作。所述云基础设施可以由所述组织或第三方管理，并且可能存在预置(on-premises)或外置(off-premises)。

[0191] b.社区云

[0192] 云基础设施由若干组织共享，并且向有共同关注点(诸如，任务、安全要求、政策以及遵约考虑)的特定社区提供支持。所述云基础设施可以由所述组织或第三方管理，并且可能存在预置或外置。

[0193] c.公共云

[0194] 云基础设施可供用于一般大众或大的工业群体并且为出售云服务的组织所拥有。

[0195] d.混合云。

[0196] 云基础设施是两个或更多个云(私有云、社区云、或公共云)的组合，所述两个或更多个云保持独立的实体，但是通过标准化技术或专有技术绑定在一起，这实现了数据和应用程序的可移植性(例如，云之间负载均衡的云爆发(cloud bursting))。

[0197] 云计算环境是面向无国界、低耦合、模块化以及语义互操作性的重点的服务。云计算的核心是包括互连节点的网络的基础设施。

[0198] 现参考图5，示出了云计算节点的实例的示意图。云计算节点10仅是合适的云计算节点的一个实例，并且并不意在表明对本文描述的本发明的实施方案的用途或功能范围有任何限制。无论如何，云计算节点10都能够被实施和/或执行上文阐述的任何功能。

[0199] 在云计算节点10中，存在计算机系统/服务器12，其利用众多其他通用或专用计算系统环境或配置来操作。可能适合于与计算机系统/服务器12一起使用的熟知的计算系统、环境和/或配置的实例包括但不限于个人计算机系统、服务器计算机系统、瘦客户端、胖客户端、手持式或膝上型装置、多处理器系统、基于微处理器的系统、机顶盒、可编程消费电子产品、网络PC、微型计算机系统、主机计算机系统以及包括任何以上系统或装置的分布式云计算环境等等。

[0200] 计算机系统/服务器12可以在由计算机系统执行的计算机系统可执行指令，诸如程序模块的一般背景下进行描述。一般而言，程序模块可以包括执行特定任务或实施特定抽象数据类型的例程、程序、对象、组件、逻辑、数据结构等等。计算机系统/服务器12可以在分布式云计算环境中实践，在所述分布式云计算环境中由通过通信网络连接的远程处理装置来执行任务。在分布式云计算环境中，程序模块可以位于包括存储器存储装置的本地和远程计算机系统存储介质中。

[0201] 如图5中所示，云计算节点500中的计算机系统/服务器505被示出呈通用计算装置的形式。计算机系统/服务器505的组件可以包括但不限于一个或多个处理器或处理单元

515、系统存储器540和总线520，所述总线520将包括系统存储器540的各种系统组件耦合至处理器515。

[0202] 总线520表示若干种类型总线结构中的任一个或多个，包括存储器总线或存储器控制器、外围总线、加速图形端口以及使用各种总线架构中的任一种的处理器或局部总线。举例来说，但不带限制性，这类架构包括工业标准架构(ISA)总线、微通道架构(MCA)总线、增强型ISA(EISA)总线、视频电子标准协会(VESA)局部总线以及外围组件互连(PCI)总线。

[0203] 计算机系统/服务器505典型地包括各种计算机系统可读介质。这类介质可以是可由计算机系统/服务器505访问的任何可用介质，并且所述介质包括易失性和非易失性介质、可移动和不可移动介质两者。

[0204] 系统存储器540可以包括呈易失性存储器形式诸如随机存取存储器(RAM)545和/或缓存存储器550的计算机系统可读介质。计算机系统/服务器505还可以包括其他可移动/不可移动、易失性/非易失性计算机系统存储介质。仅举例来说，可以提供存储系统555来用于对不可移动、非易失性磁性介质(未示出且典型地称为“硬盘驱动器”)进行读写。虽然未示出，但是可以提供用于对可移动、非易失性磁盘(例如，“软盘”)进行读写的磁盘驱动器，以及用于对可移动、非易失性光盘，诸如CD-ROM、DVD-ROM或其他光学介质进行读写的光盘驱动器。在这类情况下，每一种可以通过一个或多个数据介质接口来连接至总线520。如下文将进一步描绘和描述，存储器540可以包括具有一组(例如，至少一个)程序模块的至少一个程序产品，所述程序模块被配置来执行本发明的实施方案的功能。

[0205] 本发明的实施方案可以被实施为计算机可读信号介质，所述计算机可读信号介质可以包括其中体现有计算机可读程序代码(例如，在基带中或作为载波的部分)的传播数据信号。这种传播信号可以采取各种形式中的任一种，包括但不限于电磁信号、光学信号或其任何合适的组合。计算机可读信号介质可以是不为计算机可读存储介质并且可以传达、传播或传输由指令执行系统、设备或装置使用或与之结合的程序的任何计算机可读介质。

[0206] 计算机可读介质上体现的程序代码可以使用任何适当的介质来传输，包括但不限于无线、有线线路、光纤光缆、射频(RF)等或以上任何合适的组合。

[0207] 具有一组(至少一个)程序模块565的作业优先级程序/实用程序560可以通过举例但不带限制性地连同操作系统、一个或多个应用程序、其他程序模块以及程序数据存储在存储器540中。操作系统、一个或多个应用程序、其他程序模块和程序数据或其某一组合中的每一个可以包括联网环境的实施方式。程序模块565通常执行如由本文所描述的本发明的实施方案的功能和/或方法。

[0208] 计算机系统/服务器505还可以与一个或多个外部装置14通信，所述一个或多个外部装置14诸如有键盘、指示装置、显示器535等；使得用户能够与计算机系统/服务器505交互的一个或多个装置；和/或使得计算机系统/服务器505能够与一个或多个其他计算装置通信的任何装置(例如，网卡、调制解调器等)。这种通信可以通过I/O接口530发生。再者，计算机系统/服务器505可以通过网络适配器525与一个或多个网络，诸如局域网(LAN)、通用广域网(WAN)和/或公共网络(例如，因特网)通信。如所描绘，网络适配器525通过总线520与计算机系统/服务器505的其他组件通信。应理解，虽然未示出，但是其他硬件和/或软件组件也可以与计算机系统/服务器505结合使用。实例包括但不限于：微代码、装置驱动器、冗余处理单元、外置盘驱动器阵列、RAID系统、磁带驱动器以及数据归档存储系统等。

[0209] 现参考图6，描绘了说明性云计算环境600。如图所示，云计算环境600包括一个或多个云计算节点500，由云消费者使用的本地计算装置例如像个人数字助理(PDA)或蜂窝电话605A、台式计算机605B、膝上型计算机605C和/或汽车计算机系统605N可以与所述一个或多个云计算节点500通信。节点500可以彼此通信。可以将所述节点500物理地或虚拟地分组(未示出)在一个或多个网络，诸如如上所述的私有云、社区云、公共云或混合云、或者其组合中。这允许云计算环境600提供基础设施、平台和/或软件即服务，为此，云消费者不需要在本地计算装置上维持资源。应理解，图6中所示的计算装置605A-N的类型意在仅是说明性的，并且计算节点500和云计算环境600可以通过任何类型网络和/或网络可寻址连接(例如，使用网页浏览器)来与任何类型的计算机化装置通信。

[0210] 现参考图7，示出了通过云计算环境600(图6)提供的一组功能抽象层。事先应理解，图7中所示的组件、层和功能意在仅是说明性的，并且本发明的实施方案并不限于此。如所描绘，提供以下层和对应的功能：

[0211] 硬件和软件层700包括硬件和软件组件。硬件组件的实例包括主机。在一个实例中为基于IBM.RTM.zSeries.RTM.系统和RISC(精简指令集计算机)架构的服务器。在一个实例中为IBM pSeries.RTM.系统、IBM xSeries.RTM.系统、IBM BladeCenter.RTM.系统、存储装置、网络以及联网组件。软件组件的实例包括网络应用程序服务器软件。在一个实例中为IBM WebSphere.RTM.应用程序服务器软件和数据库软件。在一个实例中为IBM DB2.RTM.数据库软件。(IBM、zSeries、pSeries、xSeries、BladeCenter、WebSphere和DB2是国际商业机器公司在全球许多管辖区域注册的商标。)

[0212] 虚拟化层705提供了可用于提供虚拟实体的以下实例的抽象层：虚拟服务器；虚拟存储体；虚拟网络，包括虚拟专用网络；虚拟应用程序和操作系统；以及虚拟客户端。

[0213] 在一个实例中，管理层710可以提供下文描述的功能。资源调配提供计算资源和用于在云计算环境内执行任务的其他资源的动态获取。计量和定价在资源用于云计算环境时提供收入跟踪，并且在消耗这些资源时提供记账或开具发票。在一个实例中，这些资源可以包括应用程序软件许可证。安全性为云消费者和任务提供身份验证，并且为数据和其他资源提供保护。用户门户使得消费者和系统管理员能够进入云计算环境。服务级别管理提供云计算资源分配和管理，以使得能够满足所要求的服务级别。服务级别协议(SLA)规划和实现提供对云计算资源的预布置和获取，针对所述计算资源，根据SLA预先考虑了将来的要求。

[0214] 工作负载层715提供了其中可以利用云计算环境的功能的实例。可以从这个层提供的工作负载和功能的实例包括：基于流动性提供者对所传送订单的响应而确定所述流动性提供者的目标成交率；利用接收的响应来更新实际成交率；以及确定绩效水平。如上所述，针对图7描述的所有以上实例仅是说明性的，并且本发明不限于这些实例。

[0215] 应理解，如本文所述的本发明的所有功能典型地通过作业优先化来执行，所述作业优先化可以有形地体现为作业优先程序/实用程序560(图5)的程序代码565的模块。然而，这不需要是以上情况。相反，本文叙述的功能可以通过图7中所示的层700-715中的任一个来执行/实施和/或实现。

[0216] 需要再次强调的是，虽然本公开包括对云计算的详细描述，但是本文叙述的教义的实现并不限于云计算环境。相反，本发明的实施方案意在利用现在已知或将来开发的任

何类型的集群计算环境来实施。

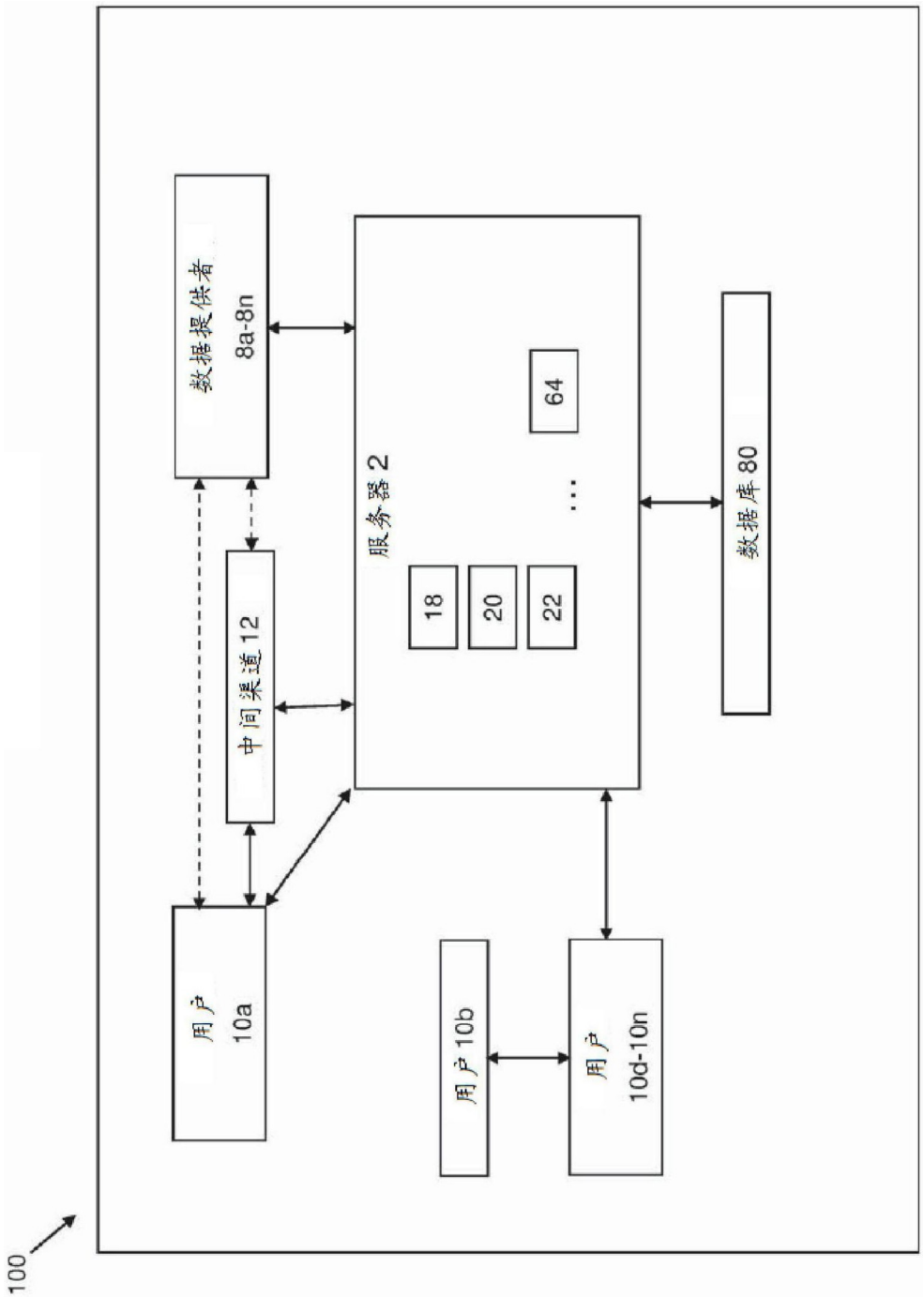

100
数据提供者
8a-8n
中间渠道12
服务器2
18
20
22
64
...
数据库80
用户
10a
用户10b
用户
10d-10n

图1

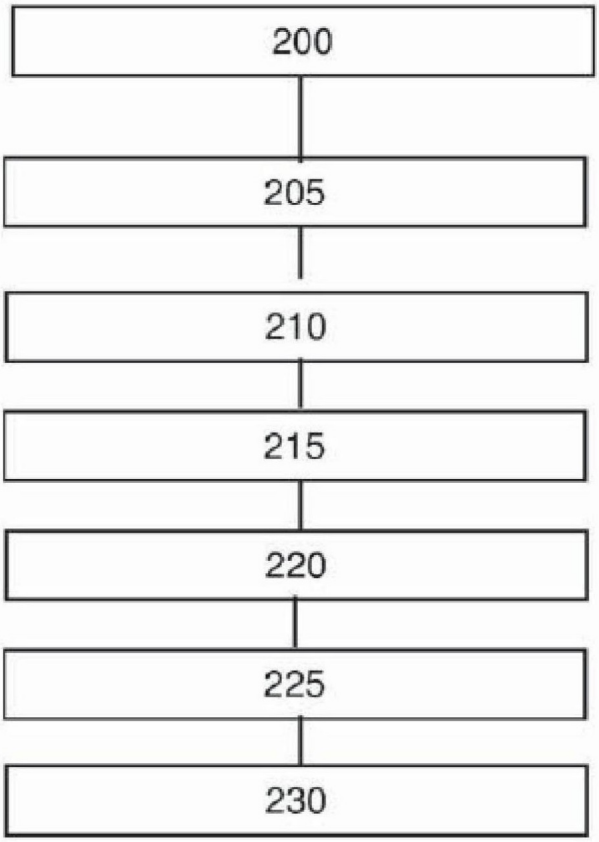
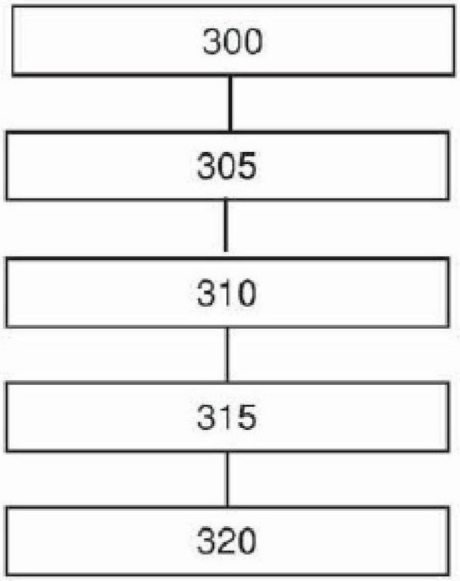

200
205
210
215
220
225
230

图2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305
310
315
320

图3

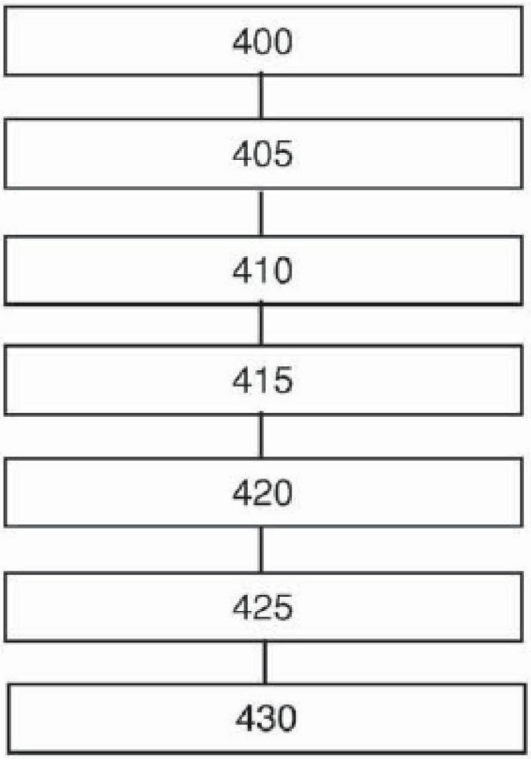
400
405
410
415
420
425
430

图4

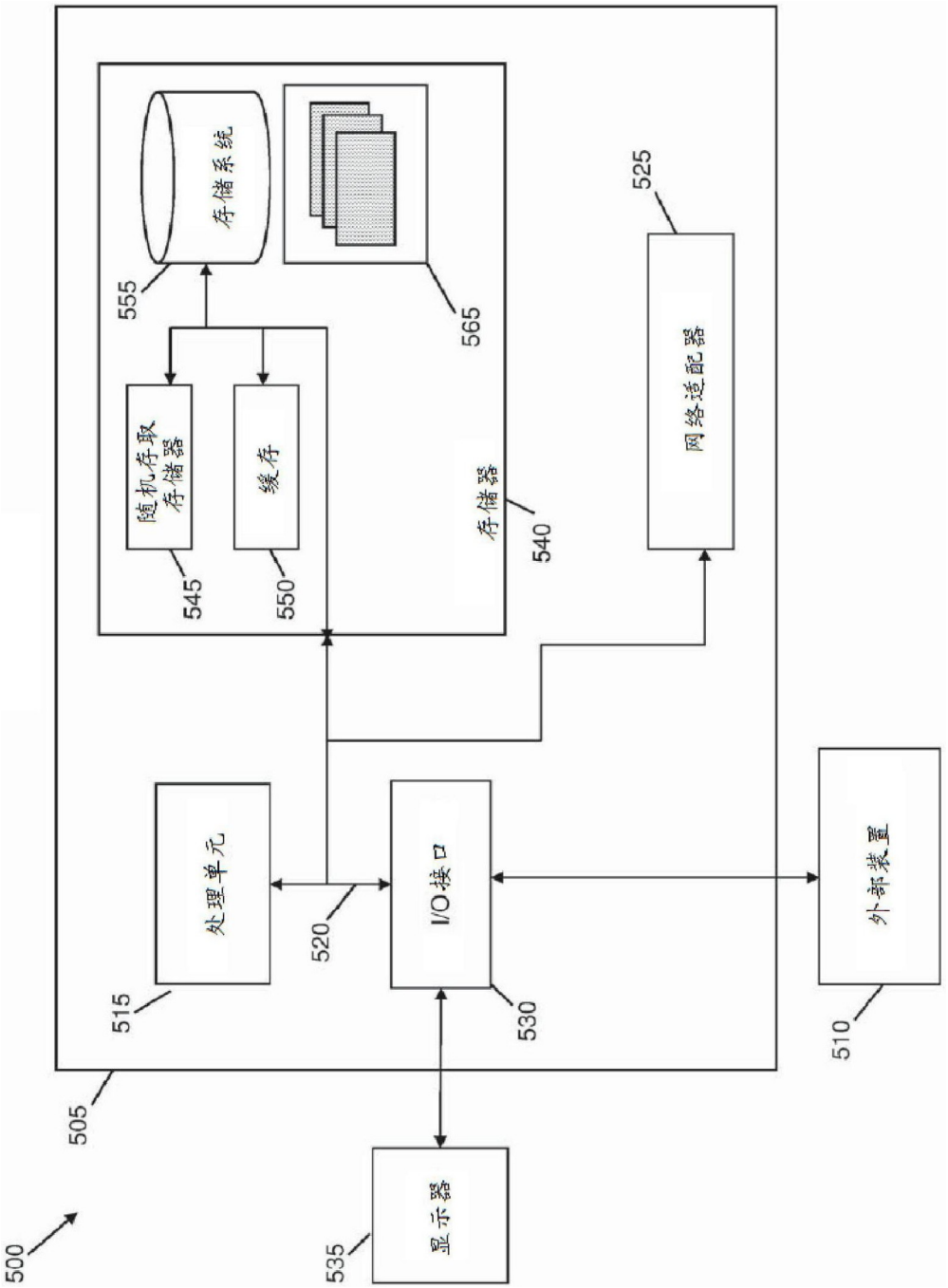
存储系统
555
565
525
网络适配器
随机存取存储器
545
缓存
550
存储器
540
处理单元
515
520
I/O接口
530
外部装置
510
505
500
显示器
535

图5

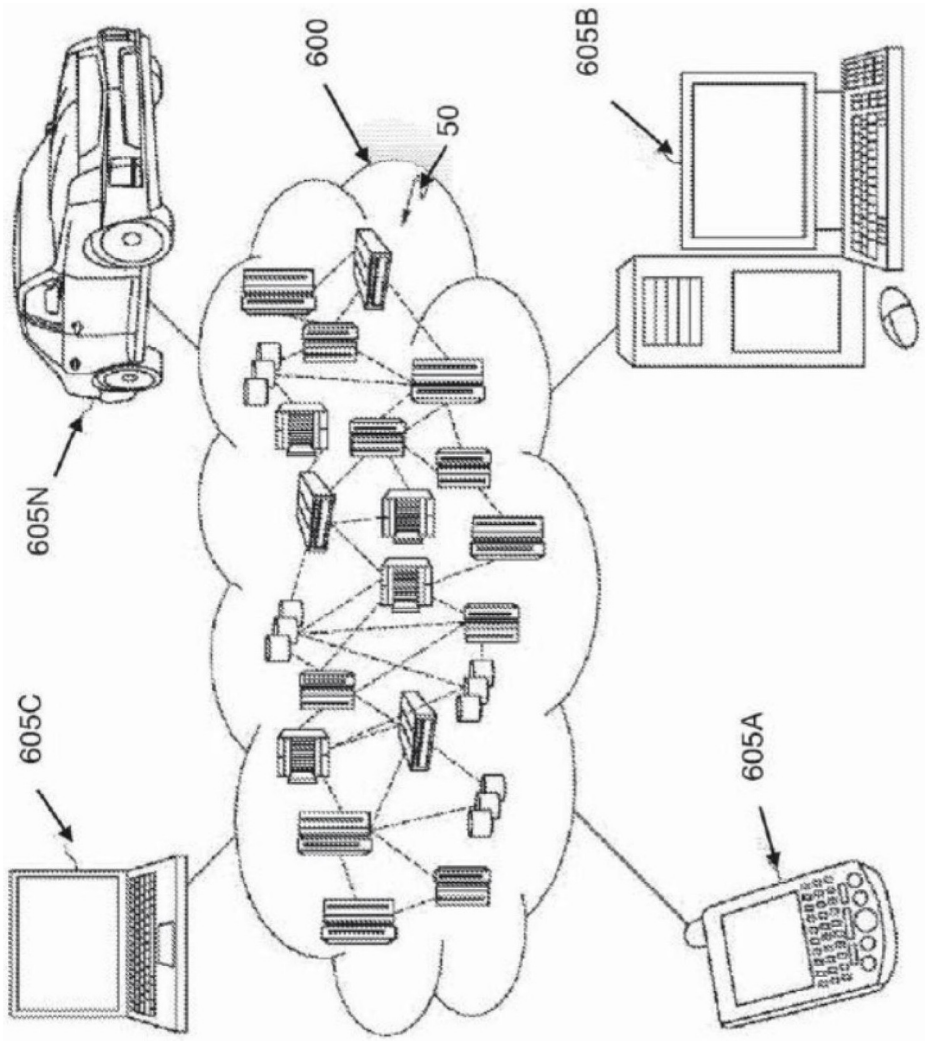

图6

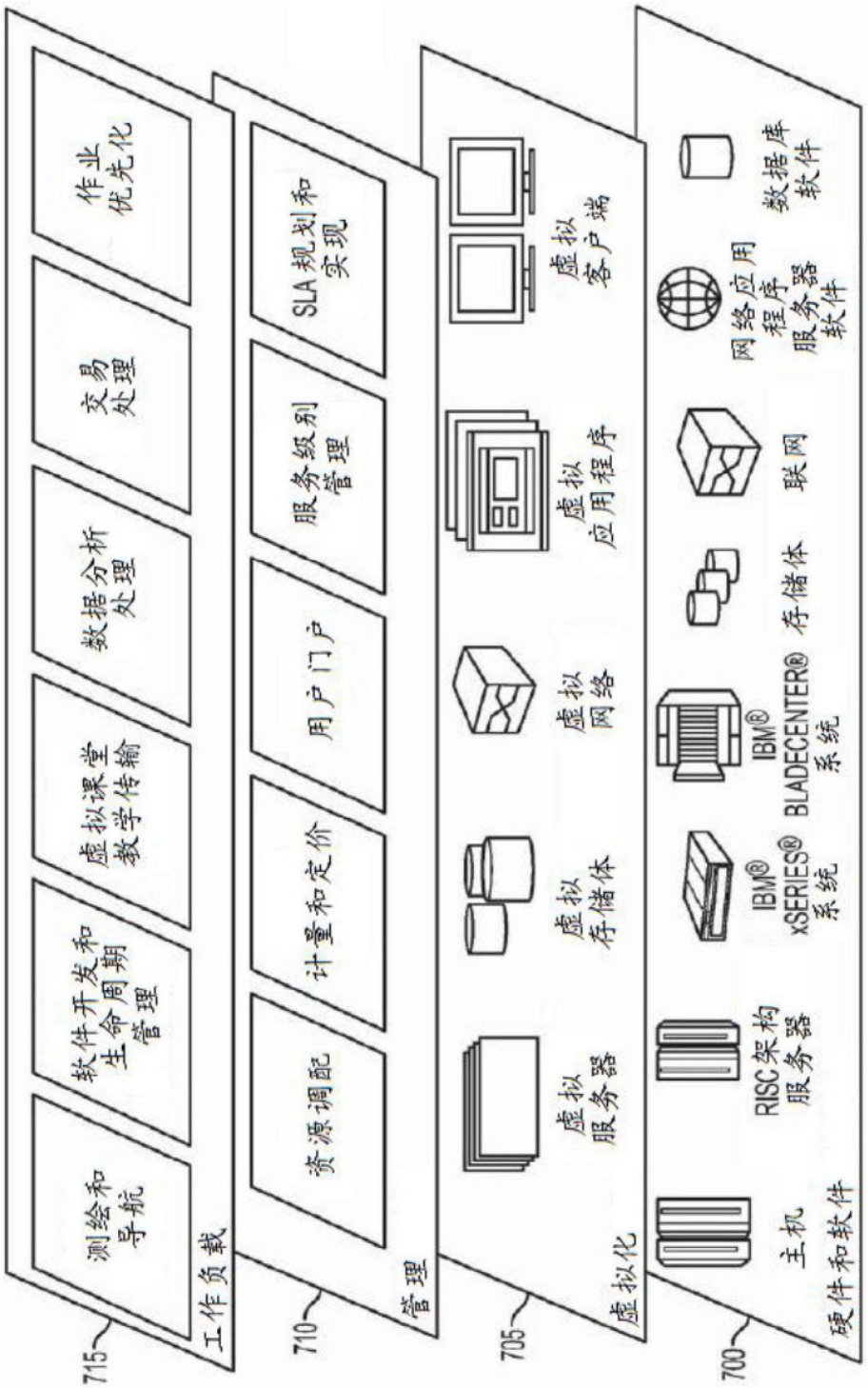
715
工作负载
测绘和导航
软件开发和生命周期管理
虚拟课堂教学传输
数据分析处理
交易处理
作业优先化
710
管理
资源调配
计量和定价
用户门户
服务级别管理
SLA规划和实现
705
虚拟化
虚拟服务器
虚拟存储体
虚拟网络
虚拟应用程序
虚拟客户端
700
硬件和软件
主机
RISC架构服务器
IBM® xSERIES® 系统
IBM® BLADECENTER® 系统
存储体
联网
网络应用程序服务器软件
数据库软件

图7