WAREHOUSE SELECTION METHOD AND APPARATUS, COMPUTER DEVICE, AND STORAGE MEDIUM

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority to Chinese Patent Application No. CN202210185580.0, filed on February 28, 2022, which is incorporated by reference herein in its entirety.

TECHNICAL FIELD

[0002] The present disclosure belongs to the technical field of wafer management, more exactly, relates to semiconductor manufacturing devices, and in particular to a warehouse selection method and apparatus, a computer device, and a storage medium.

BACKGROUND

[0003] During wafer production, warehouses are generally used to store wafer pods for facilitating timely access depending on the process. Due to random access in the process or replacement of flows of the process, uneven use of stockers in warehouses may be caused, which may easily cause that when a warehouse is specified for a wafer pod, the warehouse could not store the wafer pod due to lack of a storage space. In this case, there is a need to monitor usage data nodes of each stocker in real time by the administrator, and then move the wafer pod, so as to achieve storage of the wafer pod, which is cumbersome in operation and may lead to unavailability of stocker nodes.

[0004] Based on this, the present disclosure provides a technical solution for solving the above technical problems.

SUMMARY

[0005] An embodiment of the present disclosure provides a warehouse selection method, including: receiving a target wafer storage request, where the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported; acquiring, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker in a target warehouse; for each respective idle stocker of the at least one idle stocker: generating, according to a balance rule and the historical work parameter information of the

respective idle stocker, at least one stocker weight corresponding to the respective idle stocker; and calculating a current metric value of the respective idle stocker based on the historical work parameter information and the at least one stocker weight of the respective idle stocker; and selecting a target stocker for storing target wafers from the at least one idle stocker according to the current metric value of each of the at least one idle stocker.

[0006] An embodiment of the present disclosure further provides a warehouse selection apparatus. The apparatus includes: a storage request receiving module configured to receive a target wafer storage request, where the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported; a stocker acquiring module configured to acquire, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker in a target warehouse; a weight generating module configured to generate for each respective idle stocker of the at least one idle stocker, according to a balance rule and the historical work parameter information of the respective idle stocker, at least one stocker weight corresponding to the respective idle stocker; a metric calculating module configured to calculate a current metric value of the respective idle stocker based on the historical work parameter information and the at least one stocker weight of the respective idle stocker; and a stocker selecting module configured to select a target stocker for storing target wafers from the at least one idle stocker according to the current metric value of each of the at least one idle stocker.

[0007] An embodiment of the present disclosure further provides a computer device, including at least one memory and at least one processor, where the at least one memory is configured to store computer programs, where the at least one processor configured to execute the computer programs is configured to execute operations in the above method.

[0008] An embodiment of the present disclosure further provides a computer readable storage medium, which stores computer programs. The computer programs, when executed by at least one processor, cause the at least one processor to execute operations of the above method.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Preferred embodiments of the present disclosure will be described below with reference to the accompanying drawings in an explicit and intelligible manner, to further describe the above characteristics, technical features, advantages, and implementations.

[0010] FIG. 1 is a schematic flow chart of a warehouse selection method according to embodiments of the present disclosure.

[0011] FIG. 2 is schematic diagram of a warehouse list according to embodiments of the present disclosure.

[0012] FIG. 3 is a schematic diagram of calculating current metric values according to embodiments of the present disclosure.

[0013] FIG. 4 is a schematic structural diagram of a warehouse selection apparatus according to embodiments of the present disclosure.

[0014] FIG. 5 is an internal structural diagram of a computer device according to embodiments of the present disclosure.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0015] In order to illustrate the technical solutions of the embodiments of the present disclosure or in the related technologies more clearly, the specific embodiments of the present disclosure will be explained below with reference to the accompanying drawings. It is obvious that the drawings described below are only some embodiments of the present disclosure. For one of ordinary skill in this field, it is also possible to obtain other drawings and other embodiments based on these drawings without creative efforts.

[0016] Based on the present disclosure, those skilled in this art shall understand that one aspect described herein can be independently implemented with any other aspect, and two or more of these aspects can be combined in various ways. For example, any quantity and aspect described herein can be used to implement devices and/or practice methods. In addition, other structures and/or functionalities other than one or more of the aspects described herein may be used to implement this device and/or practice this method.

[0017] It is also to be noted that the drawings provided in the following embodiments only schematically illustrate the basic concept of the present disclosure. The drawings only show the components related to the present disclosure and are not drawn based on the number, shapes, and sizes of the components during actual implementation. The type, quantity, and

proportion of each component thereof during actual implementation can be arbitrarily changed, and the layout form of its components may also be more complex.

[0018] Furthermore, in the following description, specific details are provided to facilitate thorough understanding of the examples. However, technicians in this field will understand that the described aspects can be practiced without these specific details. The terms “first”, “second”, and the like are only used for the purpose of description rather than for indicating or implying relative importance or implying the quantity of indicated technical features. Therefore, features limited by the descriptions “first”, “second”, and the like may explicitly or implicitly include one or more of these features. In the description of the present disclosure, unless otherwise specified, “a plurality of” means two or more.

[0019] During wafer production, warehouses are generally used to store wafer pods for facilitating timely access depending on the process. A manufacturing execution system (MES) generally sends storage instructions, for example, a STOCKER LIST, to a material control system (MCS), which means that a group of stockers are used as destination addresses of the wafer pods. In this case, the MCS needs to specify a specific stocker from the group of stockers, which is generally achieved according to an average occupancy rate of the stockers, so as to achieve load balancing. Generally, a warehouse is provided with a plurality of stockers, and each stocker can accommodate a plurality of wafer pods, which is highly suitable for large-scale process applications. In the production process, a plurality of warehouses may be provided depending on the process flow, and each warehouse is generally provided with a plurality of stockers configured for storing wafer pods or wafers.

[0020] Due to random access in the process or replacement of flows of the process, uneven use of stockers in warehouses may be caused, which may easily cause that when a warehouse is specified for a wafer pod, the warehouse could not store the wafer pod due to lack of a storage space. In this case, there is a need to monitor usage data nodes of each stocker in real time by the administrator, and then move the wafer pod, so as to achieve storage of the wafer pod, which is cumbersome in operation and may lead to unavailability of stocker nodes.

[0021] Embodiments of the present disclosure provide a warehouse selection method, including: receiving a target wafer storage request, where the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported; acquiring, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle

stocker in a target warehouse; for each respective idle stocker of the at least one idle stocker: generating, according to a balance rule and the historical work parameter information of the respective idle stocker, at least one stocker weight corresponding to the respective idle stocker; and calculating a current metric value of the respective idle stocker based on the historical work parameter information and the at least one stocker weight of the respective idle stocker; and selecting a target stocker for storing target wafers from the at least one idle stocker according to the current metric value of each of the at least one idle stocker.

[0022] Embodiments of the present disclosure further provide a warehouse selection apparatus. The apparatus includes: a storage request receiving module configured to receive a target wafer storage request, where the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported; a stocker acquiring module configured to acquire, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker in a target warehouse; a weight generating module configured to generate for each respective idle stocker of the at least one idle stocker, according to a balance rule and the historical work parameter information of the respective idle stocker, at least one stocker weight corresponding to the respective idle stocker; a metric calculating module configured to calculate a current metric value of the respective idle stocker based on the historical work parameter information and the at least one stocker weight of the respective idle stocker; and a stocker selecting module configured to select a target stocker for storing target wafers from the at least one idle stocker according to the current metric value of each of the at least one idle stocker.

[0023] An embodiment of the present disclosure further provides a computer device, including at least one memory and at least one processor, where the at least one memory is configured to store computer programs, where the at least one processor configured to execute the computer programs is configured to execute operations in the above method.

[0024] An embodiment of the present disclosure further provides a computer readable storage medium, which stores computer programs. The computer programs, when executed by at least one processor, cause the at least one processor to execute operations of the above method.

[0025] The embodiments of the present disclosure, compared with the related technologies, have following advantages: storage quantities of various warehouses can be

balanced, and congestion of storage of wafer pods/wafers can be avoided, so as to avoid causing the warehouses to be unavailable, and reduce time of congestion transfer.

[0026] Technical solutions provided in embodiments of the present disclosure are illustrated below in combination with drawings.

[0027] As shown in FIG. 1, an embodiment of the present disclosure provides a warehouse selection method, which can be applied to a terminal or a server. The terminal may be, but is not limited to, various devices such as, a personal computer, a notebook computer, a smartphone, a tablet, and a portable smart device. The server can be embodied as an independent server or a server cluster including a plurality of servers. In one embodiment, the warehouse selection method can be applied to terminals or servers in the MES, and the method begins at step 101.

[0028] At step 101, a request for storage of one or more target wafers (target wafer storage request) is received, where the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported.

[0029] The material control system (MCS) is a system for management and control of materials, and is mainly used for transportation and management of front opening unified pod (Foup), also known as wafer pods, in the semiconductor plant. The transportation covers transportation inside a clean room (FAB), transportation between different clean rooms (FAB), and transportation across floors. Locations of the transportation include machines, stockers (STK), suspended temporary storage shelves (e.g., overhead buffers (OHB)), and conveyors. In this way, transfer time between the machines can be reduced and the transportation efficiency can be improved. The MES is embodied as a production informatization management system for a workshop executive level of a manufacturing enterprise. The MES can send the transfer instruction to the material control unit (e.g., MCS) according to a list of stockers, i.e., a next transfer location of the wafer is notified to the MCS by the MES. After receiving the transfer request from the MES, the MCS uses storage positions of the stocker as a basis for load balancing.

[0030] A server of a local management device (e.g., MCS) receives the target wafer storage request, where the target wafer storage request carries at least the properties of wafers to be transported and the storage capacity for the wafers to be transported. The properties of the wafers to be transported are related to a process flow to which the wafers are being currently subjected. Based on the properties, which process treatments have been carried out on the

wafers and which process treatments will be carried out on the wafers soon may be determined. The storage capacity is related to a capacity or volume that a wafer pod needs to occupy in a stocker. Wafer pods can be set to have different specifications/sizes, a plurality of shelves(racks) can be provided in the stocker, and the plurality of shelves can be set to have different sizes to accommodate different specifications of wafer pods.

[0031] At step 102, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker in a target warehouse are acquired according to the target wafer storage request.

[0032] The server acquires the historical work parameter information and the corresponding stocker identification of each of all the at least one idle stocker in the target warehouse according to the target wafer storage request. As shown in FIG. 2, the server can acquire a stocker identification of each of all stockers in target warehouse “Photo”, such as stocker GP301, stocker GP302, stocker GP303, and so on. The server can further acquire a priority of each of the stockers, for example, a priority of the stocker GP301 is 1, a priority of the stocker GP302 is 3, and a priority of the stocker GP303 is 6. In target warehouse “Furnace”, a priority of stocker GF301 is 1, a priority of stocker GF302 is 3, a priority of stocker GF303 is 6, and a priority of stocker GF304 is 9. In target warehouse “Etch”, a priority of stocker GE301 is 1, and a priority of stocker GE302 is 3. Taking the warehouse “Photo” as an example, the server acquires the historical work parameter information of each of all the stockers of the warehouse “Photo”. For example, for the GP301, a total number of commands is 10, a number of reserved commands is 3, and a rack occupancy rate is 50%. For GP302, a total number of commands is 5, a number of reserved commands is 2, and a rack occupancy rate is 30%. For GP303, a total number of commands is 7, a number of reserved commands is 1, and a rack occupancy rate is 90%.

[0033] At step 103, at least one stocker weight corresponding to each of the at least one idle stocker is generated according to a balance rule and the historical work parameter information of each of the at least one idle stocker.

[0034] The at least one stocker weight can be obtained by combining empirical values, the balance rule, and the properties of the wafer by the server. The empirical values can be obtained based on the historical work parameter information of the stocker in historical data of a material control system. The at least one stocker weight can include a weight for the priority, a weight for the number of commands (command balance weight), a weight for the rack

occupancy rate, and the like.

[0035] For example, taking the warehouse “Photo” obtained by the server as an example, since the stocker GP301, the stocker GP302, and the stocker GP303 are belong to the warehouse “Photo”, the stocker GP301, the stocker GP302, and the stocker GP303 store wafers/wafer pods of a same type. Therefore, for the GP301, the weight for the priority is 1, the command balance weight is 2, and the weight for the rack occupancy rate is 10.

[0036] For the GP302, the weight for the priority is 1, the command balance weight is 2, and the weight for the rack occupancy rate is 10.

[0037] For the GP303, the weight for the priority is 1, the command balance weight is 2, and the weight for the rack occupancy rate is 10.

[0038] However, when the target warehouse “Etch” and the target warehouse “Photo” store wafers/wafer pods of different types, weights corresponding to the stocker GE301 of the warehouse “Etch” can be identical with or different from the weights corresponding to each of the stockers of the warehouse “Photo”, for example, for the stocker GE301, the weight for the priority is 1, the command balance weight is 3, and the weight for the rack occupancy rate is 5.

[0039] The server generates, for each respective idle stocker of the at least one idle stocker, the at least one stocker weight corresponding to the respective idle stocker according to the balance rule and the historical work parameter information of the respective idle stocker. The balance rule is that the MCS can make rack occupancy rates of stockers in a same group (i.e., stockers storing FOUPs of the same type) be identical. The at least one stocker weight can be set according to the rack occupancy rates of stockers in the same group, and the MCS uses the storage positions of the stockers as the basis for load balancing. The at least one stocker weight corresponding to each stocker can be adjusted according to the priority, a command balance count, and the rack occupancy rate of the stocker. The command balance count refers to the number of commands executed by the stocker. In order to achieve load balancing, when a stoker is selected to achieve storage, for example, if one stocker has executed storage 10 times, and another stocker has executed storage 100 times, a next handling instruction is sent as much as possible to the stocker that has executed the storage 10 times. The server can adjust, for each of the stockers, the at least one stocker weight of the stocker according to the priority of the stocker, the command balance count of the stocker, and the occupancy rate of the stocker.

[0040] At step 104, a current metric value of each of the at least one idle stocker is calculated according to the historical work parameter information and the at least one stocker

weight of each of the at least one idle stocker.

[0041] The server calculates, for each of the at least one idle stocker, the current metric value of the idle stocker based on the historical work parameter information and the at least one stocker weight. The current metric value is equal to priority × weight for the priority + (number of commands + number of reserved commands) × command balance weight + rack occupancy rate × weight for the rack occupancy rate. As shown in FIG. 3, a current metric value of GP301 is: 1×1+(10+3) × 2+(50/100) ×10=32, a current metric value of GP302 is: 3×1+(5+2) × 2+(30/100) ×10=20, and a current metric value of GP303 is: 6×1+(7+1) ×2+(90/100) ×10=31.

[0042] At step 105, a target stocker for storing the target wafer is selected from the at least one idle stocker according to the current metric value of each of the at least one idle stocker.

[0043] The server selects an idle stocker as the target stocker for storing the target wafer according to the current metric value of each of the at least one idle stocker. In the step 104, the server obtains by calculating that the current metric value of GP301 is 32, the current metric value of GP302 is 20, and the current metric value of GP303 is 31. Therefore, according to the above calculated current metric values, a stocker having a minimum metric value is selected to store the target wafer. Thus, the server selects GP302 as the target stocker. When there are a plurality of warehouses that can be used for storing the target wafer, the server can determine a target stocker and a target warehouse for storing the target wafer according to current metric values.

[0044] In the above method, storage quantities of various warehouses can be balanced, congestion of storage of the wafer pods/wafers can be avoided, so as to avoid causing the warehouses to be unavailable, and reduce time of congestion transfer.

[0045] In one embodiment, the historical work parameter information and the corresponding stocker identification of each of the at least one idle stocker are acquired according to the target wafer storage request as follows. A warehouse list is obtained, where the warehouse list stores a stocker identification and corresponding historical work parameter information of each of a plurality of stockers. The at least one idle stocker that is available for storing the wafers to be transported can be selected from the warehouse list according to transfer time, the properties, and the storage capacity carried in the target wafer storage request, and the historical work parameter information and the corresponding stocker identification of

each of the at least one idle stocker are acquired.

[0046] The server acquires the warehouse list, where the warehouse list is a data list established in advance according to a correspondence relationship between warehouses and stockers. The historical work parameter information in the warehouse list further includes a stored time period of wafers/wafer pods stored in each of the stockers.

[0047] The server can select the at least one idle stocker that can store the wafers to be transported from the warehouse list according to the transfer time, the properties, and the storage capacity carried in the target wafer storage request, and acquire the historical work parameter information and the corresponding stocker identification of each of the at least one idle stocker. Therefore, in this embodiment, the server can store the wafer to be transported according to a time period, so as to ensure that the properties of each wafer to be transported is in correspondence with properties of the stocker, such that stockers with the same properties as the wafer to be transported can be fully utilized, and the time for picking up wafers from the stocker and the time for putting wafers into the stocker can be reduced.

[0048] In one embodiment, the historical work parameter information and the corresponding stocker identification of each of the at least one idle stocker are acquired according to the target wafer storage request as follows. A warehouse list is obtained, where the warehouse list stores a stocker identification and corresponding historical work parameter information of each of a plurality of stockers. Whether there is at least one idle stocker, among the plurality of stockers in the warehouse list, that is available for storing the wafers to be transported are determined according to the properties and the storage capacity. Upon determining that there is no idle stocker in the target warehouse, at least one temporary stocker in a temporary warehouse adjacent to the target warehouse is determined, and temporary status information of each of the at least one temporary stocker is modified. Historical work parameter information and a corresponding stocker identification of each of the at least one temporary stocker are obtained based on the target wafer storage request.

[0049] In this embodiment, the target wafer storage request indicates a designated target warehouse. The server acquires the warehouse list according to the target warehouse. When the server determines that there is no stocker in the warehouse list that can store the wafers to be transported according to the properties and the storage capacity, the server determines the at least one temporary stocker in the temporary warehouse adjacent to the target warehouse, and modifies the temporary status information of each of the at least one temporary

stocker. The temporary status information refers to status information indictive of whether a temporary stocker can be used. When the target wafer storage request indicates the target warehouse, the temporary status information of the temporary stocker first indicates that the temporary stocker is unavailable. However, when the target warehouse is in a non-idle state (the non-idle state may be a full load state, or in a fault state, etc.), the server modifies, according to the non-idle state of the target warehouse, status information of the temporary stocker to indicate that the temporary stocker is available.

[0050] The server acquires the historical work parameter information and the corresponding stocker identification of each of all temporary stockers based on the target wafer storage request. Afterwards, the server selects an idle stocker from the temporary warehouse as the target stocker for storing the target wafer according to operations from 103 to 105.

[0051] In the above method, when the target warehouse is unavailable for transport, the MCS may select another stocker from at least one standby warehouse as a destination of the target wafer. In this way, it is possible to quickly enable the standby warehouse to reduce transfer and storage time when the target warehouse is not idle, so as to ensure processing efficiency of the whole process.

[0052] In one embodiment, after the historical work parameter information and the corresponding stocker identification of each of the at least one temporary stocker are obtained according to the target wafer storage request, the method further includes: acquiring a waiting time of an idle stocker, corresponding to the properties of the target wafer and the storage capacity for the target wafer, in the warehouse list; and acquiring historical work parameter information and a corresponding stocker identification of each of idle stockers in the target warehouse, when the waiting time is less than a preset threshold.

[0053] The server acquires the waiting time of the idle stocker corresponding to the properties and the storage capacity in the warehouse list and acquires the historical work parameter information and the corresponding stocker identification of each of all the idle stockers in the target warehouse, when the waiting time is less than the preset threshold. When the target warehouse is unavailable for transport, the MCS may select another stocker from the at least one standby warehouse as destination of the target wafer. However, when a target stocker is changed to be available within preset waiting time, the MCS may refuse to transfer the wafers to be transported to the standby warehouse, and keep the wafers to be transported in a current warehouse and then transfer the wafer or the wafer pod (FOUP) to the target stocker

in the target warehouse until the waiting time ends. In this case, the wafer or the wafer pod (FOUP) may not be transported to the standby warehouse.

[0054] However, if the waiting time is greater than the preset threshold, the MCS may select another stocker from the at least one standby warehouse as destination of the target wafer. In this case, the wafer or the wafer pod (FOUP) may be transported to the standby warehouse according to the selected idle stocker. After operation of the wafer storage request is completed, the MCS may update the historical work parameter information of the standby stocker according to the wafer or the wafer pod (FOUP).

[0055] In one embodiment, as shown in FIG. 4, a warehouse selection apparatus is provided. The apparatus includes a storage request receiving module 401, a stocker acquiring module 402, a weight generating module 403, a metric calculating module 404, and a stocker selecting module 405.

[0056] The storage request receiving module 401 is configured to receive a target wafer storage request, where the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported.

[0057] The stocker acquiring module 402 is configured to acquire, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker in a target warehouse.

[0058] The weight generating module 403 is configured to generate, according to a balance rule and the historical work parameter information of each of the at least one idle stocker, at least one stocker weight corresponding to each of the at least one idle stocker.

[0059] The metric calculating module 404 is configured to calculate a current metric value of each of the at least one idle stocker based on the historical work parameter information and the at least one stocker weight of each of the at least one idle stocker.

[0060] The stocker selecting module 405 is configured to select an idle stocker, from the at least one idle stocker, as a target stocker for storing target wafers according to the current metric value of each of the at least one idle stocker.

[0061] In one embodiment, the stocker acquiring module includes: a list acquiring unit and an idle stocker selecting unit.

[0062] The list acquiring unit is configured to acquire a warehouse list, where the warehouse list stores a stocker identification and corresponding historical work parameter

information of each of a plurality of stockers.

[0063] The idle stocker selecting unit is configured to: select the at least one idle stocker that is available for storing one or more wafers to be transported from the warehouse list according to transfer time, the properties, and the storage capacity carried in the target wafer storage request; and acquire the historical work parameter information and the corresponding stocker identification of each of the at least one idle stocker.

[0064] In one embodiment, the stocker acquiring module includes: a list acquiring unit, a determining unit, a temporary stocker acquiring unit, and a temporary stocker selecting unit.

[0065] The list acquiring unit is configured to acquire a warehouse list, where the warehouse list stores a stocker identification and corresponding historical work parameter information of each of a plurality of stockers.

[0066] The determining unit is configured to: determine, according to the properties and the storage capacity, whether there is at least one idle stocker, among the plurality of stockers in the warehouse list, that is available for storing the wafers to be transported.

[0067] The temporary stocker acquiring unit is configured to: acquire, upon determining that there is no idle stocker in the target warehouse, at least one temporary stocker in a temporary warehouse adjacent to the target warehouse; and modify temporary status information of each of the at least one temporary stocker.

[0068] The temporary stocker selecting unit is configured to acquire, based on the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of the at least one temporary stocker.

[0069] In one embodiment, the stocker acquiring module includes: a time acquiring unit and a temporary stocker selecting unit.

[0070] The time acquiring unit is configured to acquire a waiting time of an idle stocker, corresponding to the properties of the wafers to be transported and the storage capacity for the wafers to be transported, in the warehouse list.

[0071] The temporary stocker selecting unit is configured to: acquire, in response to the waiting time being less than a preset threshold, historical work parameter information and a corresponding stocker identification of each of idle stockers in the target warehouse.

[0072] For specific limitations of the warehouse selection apparatus, reference may be made to the illustration of the warehouse selection method in the previous embodiments, which

are not be repeated herein. The various modules in the warehouse selection apparatus mentioned above can be fully or partially implemented through software, hardware, and combinations thereof. The above modules can be embedded in or independent from at least one processor in a computer device in the form of hardware, or stored in a memory of the computer device in the form of software, so as to cause the at least one processor to invoke the software to execute the corresponding operations of the above modules.

[0073] In one embodiment, a computer device is provided. The computer device can be a server, of which the inside structural diagram can be as shown in FIG. 5. The computer device includes at least one processor, at least one memory, a network interface, and at least one database that are connected through a system bus. The at least one processor of the computer device is used to provide computing and control capabilities. The at least one memory of the computer device includes a non-transitory storage medium and an internal memory. The non-transitory storage medium stores an operating system, a computer program, and a database. The internal memory provides an environment for operation of the operating system and the computer programs in the non-transitory storage medium. The at least one database of the computer device is used to store a warehouse list and other data. The network interface of the computer device is used to communicate with external terminals by network connections. The computer program, when executed by the at least one processor, causes the at least one processor to implement a warehouse selection method.

[0074] Technicians in this field can understand that the structure shown in FIG. 5 is a block diagram of some structures related to the solutions of the present disclosure and does not constitute a limitation to the computer device on which the solutions of the present disclosure are applied. The specific computer device may include more or fewer components than shown in the drawings, or combine certain components, or have different component arrangements.

[0075] In one embodiment, provided is a computer device, which includes at least one memory and at least one processor. The memory stores a computer program, and the processor is configured to execute the computer program to performing: receiving a target wafer storage request, where the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported; acquiring, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker in a target warehouse; for each respective idle stocker of the at least one idle stocker: generating, according to a balance rule and the historical work parameter information of the respective idle stocker, at least one stocker

weight corresponding to the respective idle stocker; and calculating a current metric value of the respective idle stocker based on the historical work parameter information and the at least one stocker weight of the respective idle stocker; and selecting a target stocker for storing target wafers from the at least one idle stocker according to the current metric value of each of the at least one idle stocker.

[0076] In one embodiment, the at least one processor, when executing the computer program, configured to acquire, according to the target wafer storage request, the historical work parameter information and the corresponding stocker identification of each of at least one idle stocker is configured to: acquire a warehouse list, where the warehouse list stores a stocker identification and corresponding historical work parameter information of each of a plurality of stockers; and select, from the warehouse list, the at least one idle stocker that is available for storing the wafer to be transported according to transfer time, the properties, and the storage capacity carried in the target wafer storage request, and acquiring the historical work parameter information and the corresponding stocker identification of each of all the at least one idle stocker.

[0077] In one embodiment, the at least one processor, when executing the computer program, configured to acquire, according to the target wafer storage request, the historical work parameter information and the corresponding stocker identification of each of the at least one idle stocker is configured to: acquire a warehouse list, where the warehouse list stores a stocker identification and corresponding historical work parameter information of each of a plurality of stockers; determine, according to the properties and the storage capacity, whether there is at least one idle stocker, among the plurality of stockers in the warehouse list, that is available for storing the wafer to be transported; acquire, upon determining that there is no idle stocker in the target warehouse, at least one temporary stocker in a temporary warehouse adjacent to the target warehouse, and modify temporary status information of each of the at least one temporary stocker; and acquire, based on the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of the at least one temporary stocker.

[0078] In one embodiment, after acquiring, based on the target wafer storage request, the historical work parameter information and the corresponding stocker identification of each of the at least one temporary stocker, the at least one processor is further configured to: acquire a waiting time of an idle stocker, corresponding to the properties and the storage capacity, in the warehouse list; and acquire, in response to the waiting time being less than a preset

threshold, historical work parameter information and a corresponding stocker identification of each of idle stockers in the target warehouse.

[0079] In one embodiment, provided is a computer readable storage medium, which stores a computer program, where the computer program, when executed by at least one processor, causes the ta least one processor to performing: receiving a target wafer storage request, where the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported; acquiring, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker in a target warehouse; for each respective idle stocker of the at least one idle stocker: generating, according to a balance rule and the historical work parameter information of the respective idle stocker, at least one stocker weight corresponding to the respective idle stocker; and calculating a current metric value of the respective idle stocker based on the historical work parameter information and the at least one stocker weight of the respective idle stocker; and selecting a target stocker for storing the target wafer from the at least one idle stocker according to the current metric value of each of the at least one idle stocker.

[0080] In one embodiment, the computer program, when executed by the at least one processor, causing the at least one processor to acquire, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker to cause the at least one processor to: acquire a warehouse list, where the warehouse list stores a stocker identification and corresponding historical work parameter information of each of a plurality of stockers; and select, from the warehouse list, the at least one idle stocker that is available for storing the wafer to be transported according to transfer time, the properties, and the storage capacity carried in the target wafer storage request, and acquiring the historical work parameter information and the corresponding stocker identification of each of all the at least one idle stocker.

[0081] In one embodiment, the computer program, when executed by the at least one processor, causing the at least one processor to acquire, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker to cause the at least one processor to: acquire a warehouse list, where the warehouse list stores a stocker identification and corresponding historical work parameter information of each of a plurality of stockers; determine, according to the properties and the storage capacity, whether there is at least one idle stocker, among the plurality of

stockers in the warehouse list, that is available for storing the wafer to be transported; acquire, upon determining that there is no idle stocker in the target warehouse, at least one temporary stocker in a temporary warehouse adjacent to the target warehouse, and modify temporary status information of each of the at least one temporary stocker; and acquire, based on the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of the at least one temporary stocker.

[0082] In one embodiment, after acquiring, based on the target wafer storage request, the historical work parameter information and the corresponding stocker identification of each of the at least one temporary stocker, the computer program, when executed by the at least one processor, further cause the at least one processor to: acquire a waiting time of an idle stocker, corresponding to the properties and the storage capacity, in the warehouse list; and acquire, in response to the waiting time being less than a preset threshold, historical work parameter information and a corresponding stocker identification of each of idle stockers in the target warehouse.

[0083] The above described are only specific embodiments of the present disclosure, but the protection scope of the present disclosure is not limited herein. Any change or replacement that can be easily considered by technicians familiar with this technical field within the technical scope disclosed by the present disclosure should be covered in the protection scope of the present disclosure. Therefore, the protection scope of the present disclosure should be based on the protection scope of the claims.

CLAIMS

1. A warehouse selection method, comprising:

receiving a target wafer storage request, wherein the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported;

acquiring, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker in a target warehouse;

for each respective idle stocker of the at least one idle stocker:

generating, according to a balance rule and the historical work parameter information of the respective idle stocker, at least one stocker weight corresponding to the respective idle stocker; and

calculating a current metric value of the respective idle stocker based on the historical work parameter information and the at least one stocker weight of the respective idle stocker; and

selecting a target stocker for storing target wafers from the at least one idle stocker according to the current metric value of each of the at least one idle stocker.

2. The method of claim 1, wherein acquiring, according to the target wafer storage request, the historical work parameter information and the corresponding stocker identification of each of the at least one idle stocker comprises:

acquiring a warehouse list, wherein the warehouse list stores a stocker identification and corresponding historical work parameter information of each of a plurality of stockers; and

selecting, from the warehouse list, the at least one idle stocker that is available for storing the wafers to be transported according to transfer time, the properties, and the storage capacity carried in the target wafer storage request, and acquiring the historical work parameter information and the corresponding stocker identification of each of the at least one idle stocker.

3. The method of claim 1, wherein acquiring, according to the target wafer storage request, the historical work parameter information and the corresponding stocker identification of each of the at least one idle stocker comprises:

acquiring a warehouse list, wherein the warehouse list stores a stocker identification and corresponding historical work parameter information of each of a plurality of stockers;

determining, according to the properties and the storage capacity, whether there is at least one idle stocker, among the plurality of stockers in the warehouse list, that is available for storing the wafers to be transported;

acquiring, upon determining that there is no idle stocker in the target warehouse, at least one temporary stocker in a temporary warehouse adjacent to the target warehouse, and modifying temporary status information of each of the at least one temporary stocker; and

acquiring, based on the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of the at least one temporary stocker.

4. The method of claim 3, wherein the method further comprises:

after acquiring, based on the target wafer storage request, the historical work parameter information and the corresponding stocker identification of each of the at least one temporary stocker,

acquiring a waiting time of an idle stocker, corresponding to the properties and the storage capacity, in the warehouse list; and

acquiring, in response to the waiting time being less than a preset threshold, historical work parameter information and a corresponding stocker identification of each of idle stockers in the target warehouse.

5. A warehouse selection apparatus, comprising:

a storage request receiving module configured to receive a target wafer storage request, where the target wafer storage request carries at least properties of wafers to be transported and a storage capacity for the wafers to be transported;

a stocker acquiring module configured to acquire, according to the target wafer storage request, historical work parameter information and a corresponding stocker identification of each of at least one idle stocker in a target warehouse;

a weight generating module configured to generate for each respective idle stocker of the at least one idle stocker, according to a balance rule and the historical work parameter information of the respective idle stocker, at least one stocker weight corresponding to the respective idle stocker;

a metric calculating module configured to calculate a current metric value of the respective idle stocker based on the historical work parameter information and the at least one stocker weight of the respective idle stocker; and

a stocker selecting module configured to select a target stocker for storing the target wafer from the at least one idle stocker according to the current metric value of each of the at least one idle stocker.

6. A computer device comprising at least one memory and at least one processor, wherein the at least one memory is configured to store computer programs, wherein the at least one processor configured to execute the computer programs is configured to execute operations of the method of any of claims 1 to 4.

7. A computer readable storage medium, storing computer programs, wherein the computer programs, when executed by at least one processor, cause the at least one processor to execute operations of the method of any of claims 1 to 4.