

LOGISTICS INFORMATION MANAGEMENT SYSTEM AND RELATED COMPUTER PROGRAM PRODUCT

BACKGROUND

[0001] The disclosure generally relates to an information management system and, more particularly, to a logistics information management system and related computer program product.

[0002] As the internet emerges, it is more common for the consumers to purchase goods on various e-commerce platforms. In general, after the consumer makes the purchase on the e-commerce platform, the e-commerce platform will notify the logistics vendor to make the delivery. The logistics vendor will plan the delivery path according to the collected orders for the logistician to make the delivery accordingly. However, while the logistician makes the delivery, it is commonly occurred that the recipient is not at home or not available to receive goods, and, as a result, the logistician arrives at the destination but is unable to deliver the goods to the recipient, and needs to make another delivery. Therefore, in a traditional process of delivering goods, the logistician often needs to make contact to check with the recipient whether the recipient is available to receive the goods or not, so as to avoid the situations that the recipient is not present at the delivery destination to pick up the goods.

[0003] In particular, when the goods to be delivered are with special considerations, such as fresh food, or cold, frozen products, or the like, it is more important for the logistician to check with each of the recipients in advance whether they are available to receive their goods when the logistician arrives at the delivery destination, or if someone else is available to pick up for them.

[0004] Apparently, adopting the traditional goods delivery mechanism, the logistician often needs to contact different recipients one-by-one in advance to make sure the goods can be delivered to the given destination at suitable timing. Such method not only costs the logistician extra mobile communication expense but also is time-consuming and inconvenient.

SUMMARY

[0005] In view of the foregoing, it may be appreciated that a substantial need exists for methods and apparatuses that mitigate or reduce the problems above.

[0006] An example embodiment of a logistics information management system is disclosed, comprising: a block chain subsystem, comprising multiple block chain nodes; a logistics

service subsystem, arranged to operably generate a take-over request comprising a first current vendor identification data and an order event identification data when a logistician device approaches a target region; and a recipient device, arranged to operably receive the take-over request, and to operably generate a delivery destination information request comprising the order event identification data and the first current vendor identification data according to the take-over request; wherein the block chain subsystem is arranged to operably receive the delivery destination information request, to operably search for an order event recorded in a recipient smart contract stored in the block chain subsystem according to the order event identification data, and to operably read a valid vendor identification data from the order event; wherein if the first current vendor identification data matches the valid vendor identification data, the block chain subsystem reads a delivery destination information from the order event; wherein the recipient device is further arranged to operably generate and transmit an available-to-receive notice to the logistics service subsystem after receiving the delivery destination information.

[0007] An example embodiment of a computer program product is disclosed. The computer program product is stored in a storage circuit of a logistics information management system, and enables the logistics information management system to conduct a recipient privacy protection operation. The logistics information management system comprises: a block chain subsystem, a logistics service subsystem, and the recipient device, the recipient privacy protection operation comprising: receiving a take-over request generated by the logistics service subsystem when a logistician device approaches a target region, wherein the take-over request comprises a first current vendor identification data and an order event identification data; generating a delivery destination information request comprising the order event identification data and the first current vendor identification data according to the take-over request; receiving a delivery destination information; and generating and transmitting an available-to-receive notice to the logistics service subsystem after receiving the delivery destination information; wherein the block chain subsystem is arranged to operably receive the delivery destination information request, and to operably search for an order event recorded in a recipient smart contract stored in the block chain subsystem according to the order event identification data, and the order event comprises a valid vendor identification data; wherein the block chain subsystem provides the delivery destination information only if the first current vendor identification data matches the valid vendor identification data.

[0008] Both the foregoing general description and the following detailed description are examples and explanatory only, and are not restrictive of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 shows a simplified functional block diagram of a logistics information management system according to one embodiment of the present disclosure.

[0010] FIG. 2 shows a simplified functional module diagram of a recipient privacy protection program stored in a recipient device in FIG. 1 according to one embodiment of the present disclosure.

[0011] FIG. 3 shows a simplified flowchart of a method for registering related accounts in the logistics information management system in FIG. 1 according to one embodiment of the present disclosure.

[0012] FIGS. 4~5 collectively show a simplified flowchart of a method for ordering goods according to one embodiment of the present disclosure.

[0013] FIGS. 6~8 collectively show a simplified flowchart of a method for planning a path in a target region according to one embodiment of the present disclosure.

[0014] FIGS. 9~11 collectively show a simplified flowchart of a method for positioning the location of a recipient according to one embodiment of the present disclosure.

DETAILED DESCRIPTION

[0015] Reference is made in detail to embodiments of the invention, which are illustrated in the accompanying drawings. The same reference numbers may be used throughout the drawings to refer to the same or like parts, components, or operations.

[0016] FIG. 1 shows a simplified functional block diagram of a logistics information management system 100 according to one embodiment of the present disclosure. The logistics information management system 100 is utilized to deliver goods to the related consumers. The logistics information management system 100 comprises an e-commerce vender subsystem 110, multiple logistics service subsystems (e.g., the exemplary logistics service subsystems 120~130 shown in FIG. 1), multiple purchaser devices (e.g., the exemplary purchaser devices 101~102 shown in FIG. 1), multiple recipient devices (e.g., the exemplary recipient devices 103~104 shown in FIG. 1), multiple logistician devices (e.g., the exemplary logistician devices 105~106 shown in FIG. 1), and a block chain subsystem 150.

[0017] In the present embodiment, the e-commerce vender subsystem 110 is operated by a specific e-commerce vender. The e-commerce vender may utilize the e-commerce vender

subsystem 110 to generate webpages or application screens that allow the purchaser to order goods. When the e-commerce vender subsystem 110 receives the order placed by the purchaser, the e-commerce vender subsystem 110 may inquire cooperating logistics vendors to see if any logistics vendor has the intention to deal with the delivery of the goods. After confirming the logistics vendor who is intended to deliver the goods, the e-commerce vender subsystem 110 may record the related order information and a corresponding logistics vendor identification data in the block chain subsystem 150, and provide the related order information to the logistics service subsystem (e.g., the aforementioned logistics service subsystem 120 or 130) of the corresponding logistics vendor, so that the corresponding logistics vendor can conduct the subsequent goods delivery procedure. In addition, the e-commerce vender may utilize the e-commerce vender subsystem 110 to transmit related goods information, the expected delivery time, the delivery location, and other information to a related recipient device (e.g., the aforementioned recipient device 103 or 104).

[0018] In the present embodiment, the user of the purchaser device 101 or 102 may manipulate the purchaser device 101 or 102 to purchase goods from the e-commerce vender subsystem 110 through the webpages or application screens provided by the e-commerce vender subsystem 110.

[0019] In practice, different purchaser devices 101~102 may be utilized by different purchasers. For the convenience of description, the user of the purchaser device 101 is hereinafter referred to as a first purchaser, and the user of the purchaser device 102 is hereinafter referred to as a second purchaser.

[0020] In the embodiment of FIG. 1, different logistics service subsystems 120~130 are operated by different logistics vendors, and different logistician devices 105~106 are utilized by different logisticians. For the convenience of description, the operator of the logistics service subsystem 120 is hereinafter referred to as a first logistics vendor, the operator of the logistics service subsystem 130 is hereinafter referred to as a second logistics vendor, the user of the logistician device 105 is hereinafter referred to as a first logistician, and the user of the logistician device 106 is hereinafter referred to as a second logistician. In addition, it is assumed hereinafter that the first logistician is a staff of the first logistics vendor, and the second logistician is a staff of the second logistics vendor.

[0021] After the e-commerce vender subsystem 110 provides the order information to the logistics service subsystem 120 or 130, the logistics service subsystem 120 or 130 may plan a related logistics delivery schedule according to the received order information, and the related logistics vendor may assign an appropriate logistician to conduct the goods delivery operation

according to the planned delivery schedule.

[0022] For example, if the e-commerce vender assigns the aforementioned first logistics vendor to deliver specific goods and provides the order information to the logistics service subsystem 120 through the e-commerce vender subsystem 110, the first logistics vendor may assign the first logistician to conduct the delivery operation of the aforementioned specific goods. In this situation, the first logistician may utilize the logistician device 105 to acquire the delivery schedule planned by the logistics service subsystem 120, and to conduct the delivery operation of the related goods accordingly.

[0023] After the e-commerce vender subsystem 110 provides information such as the goods information of the purchased goods, the expected delivery time, and the delivery location to the recipient device 103 or 104, the recipient device 103 or 104 is enabled to display the aforementioned information to the user through an appropriate form so that the user of the recipient device 103 or 104 can acquire the aforementioned information.

[0024] During the period in which the logistician delivers the goods to the user of the recipient device 103 or 104, the recipient device 103 or 104 may request the block chain subsystem 150 to verify whether the logistics vendor of the logistician is a valid logistics vendor. In addition, after verifying that the logistics vendor of the logistician is a valid logistics vendor, the user of the recipient device 103 or 104 may further notify the logistician of information regarding whether he or she is available to receive the goods at an assigned time through the recipient device 103 or 104 at an appropriate timing, so that the logistician can be informed of the aforementioned information.

[0025] In practice, different recipient devices 103~104 may be utilized by different users. In practical applications, the user of the recipient device 103 or 104 may be the aforementioned first purchaser or second purchaser, or may be a user other than the first purchaser and the second purchaser. For the convenience of description, the user of the recipient device 103 is hereinafter referred to as a first recipient, and the user of the recipient device 104 is hereinafter referred to as a second recipient.

[0026] As described previously, the block chain subsystem 150 records the order information generated by the e-commerce vender subsystem 110 and corresponding logistics vendor identification data. In addition, during the period in which the logistician delivers the goods to the user of the recipient device 103 or 104, the block chain subsystem 150 may verify whether the logistics vendor of the specific logistician is a valid logistics vendor per request of the recipient device 103 or 104, so as to prevent the recipient device 103 or 104 from erroneously transmitting sensitive data of its user such as the current location of the user to a

logistician of an invalid logistics vendor.

[0027] In practice, each of the purchaser devices 101~102 may be realized with devices capable of connecting to the Internet and executing browsers or related applications, such as tablet computers, notebook computers, desktop computers, mobile communication devices (e.g., smart phones, wearable devices), or other similar devices.

[0028] As shown in FIG. 1, the recipient device 103 comprises a processing circuit 162 and a storage circuit 164. The storage circuit 164 is utilized to store a recipient privacy protection program 166. In operations, the processing circuit 162 may control the overall operation of the recipient device 103, and execute the recipient privacy protection program 166 to perform a recipient privacy protection operation. In the present embodiment, each of other recipient devices of the logistics information management system 100 (e.g., the recipient device 104) has a similar main structure to that of the recipient device 103. For the sake of brevity, those descriptions will not be repeated here.

[0029] Each of the recipient devices 103~104 may be realized with a device having positioning functions and capable of connecting to the Internet, such as a tablet computer, a notebook computer, a desktop computer, a mobile communication device (e.g., a smart phone, a wearable device), or other similar device. In operations, the recipient devices 103~104 may receive and utilize signals generated by GPS (Global Positioning System), BDS (BeiDou Navigation Satellite System), AGPS (Assisted GPS), or other appropriate positioning systems to generate a position information.

[0030] Please note that in situations where the purchaser and the recipient is the same user, the purchaser device of the user and the recipient device of the user may be different devices, or may be the same device. In situations where the purchaser and the recipient are different users, the purchaser device of the purchaser and the recipient device of the recipient may be different devices, or may be the same device.

[0031] Each of the logistician devices 105~106 may be realized with a device having positioning functions and capable of connecting to the Internet, such as a mobile phone, a tablet computer, a notebook computer, or the like. In operations, each of the logistician devices 105~106 may receive and utilize signals generated by GPS, BDS, AGPS, or other appropriate positioning systems to generate the position information.

[0032] In the embodiment of FIG. 1, the e-commerce vender subsystem 110 comprises a web server 112, a database 114, and a block chain computing circuit 116. The logistics service subsystem 120 comprises a communication circuit 122, a control circuit 124, a database 126, and a block chain computing circuit 128. The logistics service subsystem 130 comprises a

communication circuit 132, a control circuit 134, a database 136, and a block chain computing circuit 138. The block chain node cluster 140 comprises multiple block chain nodes (e.g., the exemplary block chain nodes 141~147 shown in FIG. 1).

[0033] In the e-commerce vender subsystem 110, the web server 112 is arranged to operably conduct data communications with the purchaser devices 101~102 and recipient devices 103~104 through the Internet or other networks to provide webpages or application screens to the users of the purchaser devices 101~102 so that they can purchase goods and create related orders. The web server 112 is also arranged to operably provide related information such as the goods information, the expected delivery time, and the delivery location to the recipient devices 103~104. The web server 112 is further arranged to operably conduct data communications with the logistics service subsystems 120~130 and block chain subsystem 150 through appropriate networks (Intranet or Internet) to transmit the related orders to the logistics service subsystems 120~130, and to operably store the related order information in the block chain subsystem 150. The database 114 is coupled with the web server 112, and arranged to operably store individual recipient's account of the e-commerce vender subsystem 110 (hereinafter referred to as the recipient account) and order related information, so that the web server 112 can search related data from the database 114 when needed. The block chain computing circuit 116 is coupled with the web server 112, and utilized to act as one of the nodes of the block chain subsystem 150, and may serve as a communication bridge between the e-commerce vender subsystem 110 and the block chain subsystem 150.

[0034] In the logistics service subsystem 120, the communication circuit 122 is arranged to operably conduct data communications with the e-commerce vender subsystem 110 and the block chain subsystem 150 through the Internet or other networks. The control circuit 124 is coupled with the communication circuit 122, database 126, and the block chain computing circuit 128, and is arranged to control the operation of the aforementioned devices. The block chain computing circuit 128 is coupled with the communication circuit 122, and utilized to act as one of the nodes of the block chain subsystem 150, and may serve as a communication bridge between the logistics service subsystem 120 and the block chain subsystem 150.

[0035] In the logistics service subsystem 130, the communication circuit 132 is arranged to operably conduct data communications with the e-commerce vender subsystem 110 and the block chain subsystem 150 through the Internet or other networks. The control circuit 134 is coupled with the communication circuit 132, database 136, and the block chain computing circuit 138, and is arranged to control the operation of the aforementioned devices. The block chain computing circuit 138 is coupled with the communication circuit 132, and utilized to act

as one of the nodes of the block chain subsystem 150, and may serve as a communication bridge between the logistics service subsystem 130 and the block chain subsystem 150.

[0036] The block chain subsystem 150 in this embodiment collectively consists of the block chain computing circuit 116 of the e-commerce vender subsystem 110, the block chain computing circuit 128 of the logistics service subsystem 120, the block chain computing circuit 138 of the logistics service subsystem 130, the multiple block chain nodes 141~147 of the block chain node cluster 140.

[0037] In practice, the web server 112 may be realized with a single server, or may be realized with the combination of multiple servers located in the same geographical region or in different geographical regions. Each of the block chain computing circuits 116, 128, 138, and the block chain nodes 141~147 may be realized with one or more processor modules or computers suitable for performing a consensus algorithm of the block chain. Each of the communication circuits 122 and 132 may be realized with various suitable circuits complying with relevant network communication protocols, wireless communication protocols, or mobile communication protocols, such as NICs (Network Interface Cards), Wi-Fi circuits, mobile communication circuits, or the like. Each of the control circuits 124 and 134 may be realized with one or more processor modules having appropriate computing capability. Each of the databases 114, 126 and 136 may be realized with various relational databases, or non-relational databases.

[0038] In some embodiments, the block chain computing circuit 116 may be integrated into the web server 112. Similarly, the block chain computing circuit 128 may be integrated into the control circuit 124, or the block chain computing circuit 138 may be integrated into the control circuit 134.

[0039] Please note that each of the aforementioned purchaser devices 101~102, the recipient devices 103~104, the logistician devices 105~106, the e-commerce vender subsystem 110, and the logistics service subsystems 120~130 may be equipped with human interface devices (e.g., monitors, keyboards, computer mouses, touch screens, or the like) for the users to manipulate. In order to simplify the complexity of the drawing, these human interface devices are not illustrated in FIG. 1.

[0040] The recipient privacy protection program 166 of the aforementioned recipient device 103 may be realized with computer program products consisting of one or more functional modules. For example, FIG. 2 shows a simplified functional module diagram of the recipient privacy protection program 166 stored in a recipient device in FIG. 1. In the embodiment of FIG. 2, the recipient privacy protection program 166 comprises an account creating module

210, a take-over request processing module 220, a position request processing module 230, and an encryption module 240.

[0041] A method for registering related accounts in the logistics information management system 100 will be further described below by reference to FIG. 3. FIG. 3 shows a simplified flowchart of a method for registering related accounts in the logistics information management system 100 in FIG. 1 according to one embodiment of the present disclosure.

[0042] In the flowchart of FIG. 3, operations within a column under the name of a specific device are operations to be performed by the specific device. For example, operations within a column under the label "recipient device" are operations to be performed by any one of the recipient devices; operations within a column under the label "e-commerce vender subsystem" are operations to be performed by the e-commerce vender subsystem 110; operations within a column under the label "block chain subsystem" are operations to be performed by the block chain subsystem 150; operations within a column under the label "logistics service subsystem" are operations to be performed by any one of the logistics service subsystems, and so forth. The same analogous arrangement also applies to the subsequent flowcharts.

[0043] In order to deploy smart contracts, to inquire or modify the content of the smart contracts on the block chain subsystem 150, the e-commerce vender may register on the block chain subsystem 150 so as to acquire a qualification to log in. For example, the e-commerce vender may utilize the e-commerce vender subsystem 110 to register on the block chain subsystem 150. In this situation, the e-commerce vender subsystem 110 may perform the operation 302 to transmit a corresponding registration request to the block chain subsystem 150.

[0044] In practice, the e-commerce vender subsystem 110 may utilize the web server 112 or the block chain computing circuit 116 to conduct data communications with the block chain subsystem 150 so as to transmit the registration request to the block chain subsystem 150.

[0045] In the operation 304, the block chain subsystem 150 may receive the registration request generated by the e-commerce vender subsystem 110.

[0046] Then, the block chain subsystem 150 may perform the operation 306 to generate an e-commerce vender subsystem PA (personal account) corresponding to the e-commerce vender subsystem 110 according to the registration request of the e-commerce vender subsystem 110.

[0047] In the operation 308, the block chain subsystem 150 may transmit the account information of the e-commerce vender subsystem PA (hereinafter referred to as the e-commerce vender PA information) to the e-commerce vender subsystem 110. The aforementioned e-commerce vender PA information generally comprises a block chain address

representing an e-commerce vender subsystem PA (hereinafter referred to as the e-commerce vender PA block chain address), and a private key corresponding to the e-commerce vender subsystem 110 or its e-commerce vender (hereinafter referred to as the e-commerce vender private key).

[0048] In the operation 310, the e-commerce vender subsystem 110 may receive the e-commerce vender PA information generated by the block chain subsystem 150 through the web server 112 or the block chain computing circuit 116, and may store the received e-commerce vender PA information in the database 114. Afterwards, the e-commerce vender may utilize the e-commerce vender subsystem 110 to log in to the block chain subsystem 150 with the acquired e-commerce vender PA block chain address and the e-commerce vender private key so as to create, inquire, or modify related smart contracts.

[0049] Similarly, in order to access the information in the block chain subsystem 150, the logistics vendor may register on the block chain subsystem 150 so as to acquire a qualification to log in. For example, the logistics vendor may utilize a corresponding logistics service subsystem to register on the block chain subsystem 150. In this situation, the logistics service subsystem may perform the operation 312 to transmit a corresponding registration request to the block chain subsystem 150.

[0050] For example, when the first logistics vendor utilizes the logistics service subsystem 120 to register on the block chain subsystem 150, the control circuit 124 of the logistics service subsystem 120 performs the operation 312 to utilize the communication circuit 122 or the block chain computing circuit 128 to transmit a corresponding registration request to the block chain subsystem 150.

[0051] For another example, when the second logistics vendor utilizes the logistics service subsystem 130 to register on the block chain subsystem 150, the control circuit 134 of the logistics service subsystem 130 performs the operation 312 to utilize the communication circuit 132 or the block chain computing circuit 138 to transmit a corresponding registration request to the block chain subsystem 150.

[0052] In the operation 314, the block chain subsystem 150 receives the registration request generated by the logistics service subsystem. For example, the block chain subsystem 150 may receive the registration request generated by the logistics service subsystem 120 or the registration request generated by the logistics service subsystem 130.

[0053] In the operation 316, the block chain subsystem 150 may generate a logistics service subsystem PA corresponding to a specific logistics service subsystem according to the registration request of the specific logistics service subsystem.

[0054] For example, the block chain subsystem 150 may generate a first logistics service subsystem PA corresponding to the logistics service subsystem 120 according to the registration request of the logistics service subsystem 120.

[0055] For another example, the block chain subsystem 150 may generate a second logistics service subsystem PA corresponding to the logistics service subsystem 130 according to the registration request of the logistics service subsystem 130.

[0056] In the operation 318, the block chain subsystem 150 may transmit the account information of the logistics service subsystem PA to the corresponding logistics service subsystem.

[0057] For example, the block chain subsystem 150 may transmit the account information of the first logistics service subsystem PA (hereinafter referred to as first account information) to the logistics service subsystem 120. The aforementioned first account information generally comprises a block chain address representing the first logistics service subsystem PA (hereinafter referred to as a first block chain address) and a private key corresponding to the logistics service subsystem 120 or the first logistics vendor (hereinafter referred to as a first private key). In this situation, the control circuit 124 of the logistics service subsystem 120 may perform the operation 320 to utilize the communication circuit 122 or the block chain computing circuit 128 to receive the aforementioned first account information, and the control circuit 124 may store the first account information in the database 126.

[0058] For another example, the block chain subsystem 150 may transmit the account information of the second logistics service subsystem PA (hereinafter referred to as second account information) to the logistics service subsystem 130. The aforementioned second account information generally comprises a block chain address representing the second logistics service subsystem PA (hereinafter referred to as a second block chain address) and the private key corresponding to the logistics service subsystem 130 or the second logistics vendor (hereinafter referred to as a second private key). In this situation, the control circuit 134 of the logistics service subsystem 130 may perform the operation 320 to utilize the communication circuit 132 or the block chain computing circuit 138 to receive the aforementioned second account information, and the control circuit 134 may store the second account information in the database 136.

[0059] Afterwards, the first logistics vendor may utilize the logistics service subsystem 120 to log in to the block chain subsystem 150 with the aforementioned first block chain address and first private key so as to access the block chain subsystem 150. Similarly, the second logistics vendor may utilize the logistics service subsystem 130 to log in to the block chain

subsystem 150 with the aforementioned second block chain address and second private key so as to access the block chain subsystem 150.

[0060] On the other hand, in order to receive some notifications (such as the goods information, the expected delivery time, and the delivery location) from the e-commerce vender subsystem 110, the recipient may register on the web server 112 of the e-commerce vender subsystem 110 so as to receive the aforementioned notifications.

[0061] For example, the aforementioned first recipient may utilize the recipient device 103 to register on the web server 112 of the e-commerce vender subsystem 110. In practice, the first recipient may input related registration information, such as a recipient's name, a recipient's alias, an account name, a phone number, an identification number, and/or other information which can be used to identify the identity of the first recipient, on the recipient device 103 so as to register on the e-commerce vender subsystem 110. The aforementioned account name may be a combination of letters, numbers, and/or symbols configured by the first recipient. In this situation, the recipient device 103 performs the operation 322.

[0062] In the operation 322, the processing circuit 162 transmits a corresponding recipient account request comprising the aforementioned registration information to the web server 112 of the e-commerce vender subsystem 110 under the control of the account creating module 210 of the recipient privacy protection program 166.

[0063] Then, the web server 112 may perform the operation 324 to receive the recipient account request generated by the recipient device 103.

[0064] In the operation 326, the web server 112 of the e-commerce vender subsystem 110 may create a corresponding recipient account (hereinafter referred to as a first recipient account) in response to the received recipient account request, and store the account information of the first recipient account in the database 114. In practice, the account information of the first recipient account may comprise the aforementioned registration information of the first recipient, such as the recipient's name, the recipient's alias, the account name, the phone number, the identification number, and/or other information which can be used to identify the identity of the first recipient.

[0065] In the operation 328, the web server 112 of the e-commerce vender subsystem 110 may transmit the aforementioned account information of the first recipient account to the recipient device 103.

[0066] In this situation, the recipient device 103 performs the operation 330. In the operation 330, the account creating module 210 of the recipient privacy protection program 166 may control the processing circuit 162 to receive the account information of the first

recipient account generated by the e-commerce vender subsystem 110. As a result, the first recipient is enabled to utilize the recipient device 103 to log in to the web server 112 of the e-commerce vender subsystem 110 with the first recipient account.

[0067] In the logistics information management system 100, the users of other recipient devices (e.g., the aforementioned recipient device 104) may utilize their recipient devices to register on the e-commerce vender subsystem 110 according to the method as elaborated above. For example, the aforementioned second recipient may utilize the recipient device 104 to register on the e-commerce vender subsystem 110 so as to acquire a corresponding second recipient account.

[0068] As shown in FIG. 3, after the e-commerce vender subsystem 110 creates corresponding recipient accounts for respective recipients, the e-commerce vender subsystem 110 further performs the operation 332.

[0069] In the operation 332, the web server 112 or the block chain computing circuit 116 may transmit a recipient smart contract creating request corresponding to a specific recipient to the block chain subsystem 150.

[0070] Then, the block chain subsystem 150 performs the operation 334 to receive the recipient smart contract creating request generated by the e-commerce vender subsystem 110.

[0071] In the operation 336, the block chain subsystem 150 may create a corresponding recipient smart contract in response to the received recipient smart contract creating request.

[0072] In the operation 338, the block chain subsystem 150 may transmit an identification data of the generated recipient smart contract (hereinafter referred to as a recipient smart contract identification data) to the e-commerce vender subsystem 110. In practice, the aforementioned recipient smart contract identification data may be realized with the block chain address of the recipient smart contract in the block chain subsystem 150.

[0073] In the operation 340, the web server 112 or the block chain computing circuit 116 of the e-commerce vender subsystem 110 may receive the recipient smart contract identification data generated by the block chain subsystem 150, and the web server 112 may store the recipient smart contract identification data in the database 114 and may establish a correlation between the recipient smart contract identification data and a recipient account corresponding to the specific recipient.

[0074] In the operation 342, the web server 112 of the e-commerce vender subsystem 110 may transmit the recipient smart contract identification data generated by the block chain subsystem 150 to a corresponding recipient device, and the recipient device performs the operation 344 to receive and store the aforementioned recipient smart contract identification

data.

[0075] For example, after the e-commerce vender subsystem 110 creates the first recipient account corresponding to the first recipient, the e-commerce vender subsystem 110 may perform the operation 332 to transmit a recipient smart contract creating request corresponding to the first recipient to the block chain subsystem 150, so that the block chain subsystem 150 performs the operation 336 to create a first recipient smart contract corresponding to the first recipient. Afterwards, the block chain subsystem 150 may transmit the first recipient smart contract identification data to the e-commerce vender subsystem 110, and the web server 112 may perform the operation 340 to store the first recipient smart contract identification data in the database 114. In addition, the web server 112 further performs the operation 342 to transmit the first recipient smart contract identification data to the corresponding recipient device 103. In this situation, the processing circuit 162 of the recipient device 103 performs the operation 344 under control of the account creating module 210 of the recipient privacy protection program 166 to receive and store the first recipient smart contract identification data.

[0076] For another example, after the e-commerce vender subsystem 110 creates the second recipient account corresponding to the second recipient, the e-commerce vender subsystem 110 may perform the operation 332 to transmit a recipient smart contract creating request corresponding to the aforementioned second recipient to the block chain subsystem 150, so that the block chain subsystem 150 performs the operation 336 to create a second recipient smart contract corresponding to the second recipient. Afterwards, the block chain subsystem 150 may transmit the second recipient smart contract identification data to the e-commerce vender subsystem 110, and the web server 112 may perform the operation 340 to store the second recipient smart contract identification data in the database 114. In addition, the web server 112 further performs the operation 342 to transmit the second recipient smart contract identification data to the corresponding recipient device 104. In this situation, the recipient device 104 performs the operation 344 under control of its recipient privacy protection program (not illustrated in the drawings) to receive and store the second recipient smart contract identification data.

[0077] The operations of the logistics information management system 100 when different purchasers order goods will be further described in the following by reference to FIGS. 4~5. FIGS. 4~5 collectively show a simplified flowchart of a method for ordering goods according to one embodiment of the present disclosure.

[0078] When a purchaser wants to purchase specific goods, the purchaser may log in to the web server 112 of the e-commerce vender subsystem 110 through his or her purchaser device,

and may select goods and provide the recipient information and the delivery location through the webpages or application screens provided by the web server 112. In practice, the purchaser may provide the information associated with a specific recipient, such as a recipient's name, a recipient's alias, an account name, a phone number, an identification number, and/or other information which can be used to identify the identity of the recipient, to the web server 112 to be utilized as the aforementioned recipient information.

[0079] In practice, the aforementioned recipient information may be or may comprise the recipient's name, the recipient's alias, the recipient's account name, the recipient's phone number, the recipient's identification number, and/or other information which can be used to identify the identity of the recipient. In addition, the aforementioned delivery location may be or may comprise a specific address, a specific positioning coordinate, descriptive texts regarding a specific location, or descriptive texts regarding the correlation between the delivery location and a specific landmark.

[0080] In this situation, the web server 112 of the e-commerce vender subsystem 110 may perform the operation 402 to receive the goods information (e.g., the goods name, the goods serial number, the goods code, the goods identification number), the recipient information, and the delivery location configured by the purchaser.

[0081] In some embodiments, in addition to the aforementioned goods identification data, recipient information, and delivery location, the purchaser may further utilize the purchaser device to configure an assigned delivery time regarding the goods, such as a specific date, and/or a specific period (e.g., morning, afternoon, evening, and/or a specific time point), through the webpages or application screens provided by the web server 112.

[0082] In this situation, the web server 112 of the e-commerce vender subsystem 110 may receive the assigned delivery time configured by the purchaser in the operation 402.

[0083] For example, when the first purchaser utilizes the purchaser device 101 to log in to the web server 112 and purchase goods, the first purchaser may configure related goods information (hereinafter referred to as a first target goods information), a recipient information (hereinafter referred to as a first target recipient information), a delivery location (hereinafter referred to as a first target delivery location), and an assigned delivery time (hereinafter referred to as a first target delivery time) through the purchaser device 101. In this situation, the web server 112 may perform the operation 402 to receive the first target goods information, the first target recipient information, the first target delivery location, and the first target delivery time configured by the first purchaser through the purchaser device 101.

[0084] For another example, when the second purchaser utilizes the purchaser device 102

to log in to the web server 112 and purchase goods, the second purchaser may configure the related goods information (hereinafter referred to as a second target goods information), the recipient information (hereinafter referred to as a second target recipient information), the delivery location (hereinafter referred to as a second target delivery location), and the assigned delivery time (hereinafter referred to as a second target delivery time) through the purchaser device 102. In this situation, the web server 112 may perform the operation 402 to receive the second target goods information, the second target recipient information, the second target delivery location, and the second target delivery time configured by the second purchaser through the purchaser device 101.

[0085] In the operation 404, the web server 112 of the e-commerce vender subsystem 110 may create a corresponding initial order comprising the goods information, the recipient information, the delivery location, and the assigned delivery time configured by the purchaser.

[0086] For example, the web server 112 may create a corresponding first initial order in the operation 404 according to the first target goods information, the first target recipient information, the first target delivery location, and the first target delivery time (if the first purchaser has assigned a delivery time) configured by the first purchaser. In practice, the web server 112 may further record goods attributes (e.g., whether the goods are refrigerated items, frozen items, fragile items, large items, or the like) corresponding to the first target goods in the aforementioned first initial order.

[0087] For another example, the web server 112 may create a corresponding second initial order in the operation 404 according to the second target goods information, the second target recipient information, the second target delivery location, and the second target delivery time (if the second purchaser has assigned a delivery time) configured by the second purchaser. In practice, the web server 112 may further record goods attributes (e.g., whether the goods are refrigerated items, frozen items, fragile items, large items, or the like) corresponding to the second target goods in the aforementioned second initial order.

[0088] In the operation 406, the web server 112 of the e-commerce vender subsystem 110 may conduct a location de-identification process on the delivery location configured by the purchaser so as to generate a delivery destination information corresponding to the delivery location. In practice, the web server 112 may generate the corresponding delivery destination information by removing some information of the delivery location that can be used to determine the specific spot or by obscuring the specific location of the delivery location, so that the delivery destination information may be utilized to represent a specific delivery destination having a spatial correlation with the delivery location, but the delivery destination

information can not be utilized to recover the specific spot of the delivery location.

[0089] For example, assuming that the first target delivery location configured by the first purchaser is a specific address, the web server 112 may conduct the location de-identification process on the specific address to generate a first delivery destination information which corresponds to the specific address but does not comprise the full text of the specific address. For example, the web server 112 may remove the door number and the floor information from the specific address, and utilize the resulting information to be the first delivery destination information. For another example, the web server 112 may remove the door number, the floor information, and the street section number from the specific address, and utilize the resulting information to be the first delivery destination information. For another example, the web server 112 may remove the door number, the floor information, and the street name from the specific address, and utilize the resulting information to be the first delivery destination information.

[0090] For another example, assuming that the first target delivery location configured by the first purchaser is a geographical coordinate in a data format (x1,y1), the web server 112 may conduct the location de-identification process on the geographical coordinate to generate a geographical grid which corresponds to the geographical coordinate but covers a wider area, and utilize the resulting geographical grid to be a corresponding first delivery destination information. For example, the web server 112 may extend the geographical coordinate to a predetermined extent (e.g., 3 meters, 5 meters, 10 meters, 20 meters, 50 meters, 100 meters, or the like) to form a corresponding geographical grid, and the web server 112 may utilize the resulting geographical grid to be the corresponding first delivery destination information of the first target delivery location.

[0091] Similarly, the web server 112 may adopt various methods described above to conduct the location de-identification process on the second target delivery location configured by the second purchaser in the operation 406 so as to generate a corresponding second delivery destination information.

[0092] Each time an initial order is created by the web server 112, the web server 112 may perform the operation 408 to generate a corresponding delivery request according to the initial order. As described previously, the content of individual initial order may comprise information such as the goods information, the recipient information, the delivery location, the target delivery time, and the goods attributes configured by the purchaser. In practice, the web server 112 may utilize appropriate data format to integrate the goods information recorded in the initial order, a delivery destination information generated based on the delivery location,

and an expected delivery time into a delivery request corresponding to the initial order, so that the content of the delivery request comprises the goods information, the delivery destination information, and the expected delivery time. The aforementioned expected delivery time may be the target delivery time configured by the purchaser, or may be a delivery time automatically configured by the e-commerce vender subsystem 110 according to a predetermined condition. For example, the e-commerce vender subsystem 110 may add a predetermined quantity of hours or days to the time point at which the initial order is created to form the expected delivery time. In some embodiments, the web server 112 may further records the recipient information and/or the goods attributes (e.g., whether the goods are refrigerated items, frozen items, fragile items, large items, or the like) in the delivery request corresponding to the initial order.

[0093] In practice, once a delivery request is generated by the web server 112, the web server 112 may transmit the delivery request to one or more logistics service subsystems. Alternatively, the web server 112 may generate multiple delivery requests first, and then transmit the multiple delivery requests to one or more logistics service subsystems on a batch basis.

[0094] For example, the web server 112 may transmit a delivery request corresponding to the aforementioned initial order to a specific logistics service subsystem once the delivery request is generated by the web server 112 in the operation 408.

[0095] In one embodiment, the web server 112 may transmit the delivery request to a randomly selected logistics service subsystem.

[0096] In another embodiment, the e-commerce vender may respectively assign a corresponding priority to each of the logistics service subsystems of all cooperating logistics vendor in advance, and the web server 112 may transmit the delivery request to the logistics service subsystem having a highest priority in the operation 408.

[0097] For the convenience of description, it is assumed hereinafter that the web server 112 transmits the delivery request to the logistics service subsystem 120 corresponding to the first logistics vendor in the operation 408. In this situation, the communication circuit 122 of the logistics service subsystem 120 performs the operation 410 to receive the delivery request generated by the web server 112.

[0098] Then, the control circuit 124 of the logistics service subsystem 120 may determine whether to accept the delivery request generated by the web server 112 according to a manipulation of a relevant personnel or according to a predetermined logistics processing capacity algorithm. For example, the control circuit 124 or the relevant personnel may take the goods attributes, a distance of the delivery destination, the expected delivery time, a quantity

of available vehicles, types of available vehicles, types of equipment on the available vehicles, a quantity of available logisticians, and/or other various related factors into consideration so as to determine whether the received delivery request can be accepted or not.

[0099] If the control circuit 124 determines to reject the delivery request, the control circuit 124 may perform the operation 412 to transmit a corresponding rejection notice to the web server 112 through the communication circuit 122. In this situation, the web server 112 performs the operation 414 to receive the rejection notice generated by the logistics service subsystem 120.

[0100] In this situation, the web server 112 may transmit the delivery request to another randomly selected logistics service subsystem (e.g., the logistics service subsystem 130). Alternatively, the web server 112 may transmit the delivery request to another logistics service subsystem with a next highest priority (e.g., the logistics service subsystem 130).

[0101] On the contrary, if the control circuit 124 determines to accept the delivery request, the control circuit 124 may perform the operation 416 to transmit a corresponding acceptance notice to the web server 112 through the communication circuit 122.

[0102] For another example, the web server 112 may generate multiple delivery requests corresponding to multiple initial orders in the operation 408 first, and then transmit the multiple delivery requests to a specific logistics service subsystem on a batch basis.

[0103] In one embodiment, the web server 112 may transmit the multiple delivery requests to a randomly selected logistics service subsystem (e.g., the logistics service subsystem 120) on a batch basis.

[0104] In another embodiment, the e-commerce vender may respectively assign a corresponding priority to each of the logistics service subsystems of all cooperating logistics vendors in advance, and the web server 112 may transmit the multiple delivery requests to the logistics service subsystem having a highest priority on a batch basis in the operation 408.

[0105] If the web server 112 received a rejection notice generated by a logistics service subsystem in response to the multiple delivery requests, the web server 112 may transmit the multiple delivery requests to another randomly selected logistics service subsystem (e.g., the logistics service subsystem 130). Alternatively, the web server 112 may transmit the multiple delivery requests to another logistics service subsystem with the next highest priority (e.g., the logistics service subsystem 130). Other operations of the logistics service subsystem are similar to operations as elaborated above, those descriptions will not be repeated here.

[0106] Since the web server 112 conducts the location de-identification process on the delivery location to convert the delivery location into the corresponding delivery destination

information in the aforementioned operation 406, the control circuit 124 of the logistics service subsystem 120 is not possible to acquire the specific address or the precise geographical coordinate of the delivery location during the process in which the control circuit 124 of the logistics service subsystem 120 determines whether to accept the delivery request. Therefore, the control circuit 124 would not and does not need to take the specific address or the precise geographical coordinate of the delivery location into consideration. The aforementioned approach ensures that the logistics service subsystem 120 is not possible to acquire the specific address or the precise geographical coordinate of the delivery location at this stage, so as to prevent the delivery location of goods from leaking due to various manual factors or technical problems, thereby providing a better protection for the privacy of the delivery location of goods.

[0107] In the operation 418, the web server 112 receives the acceptance notice generated by the logistics service subsystem 120, and creates a corresponding target order.

[0108] In practice, the web server 112 may create a corresponding target order comprising partial content of the corresponding initial order, the delivery destination information and expected delivery time in the corresponding delivery request, and the identification data of the logistics vendor who accepts the delivery request in the operation 418. In the present embodiment, the logistics vendor who accepts the delivery request refers to the first logistics vendor corresponding to the logistics service subsystem 120.

[0109] For example, the web server 112 may create a corresponding target order comprising the goods information, the delivery destination information, the expected delivery time, and the identification data of the first logistics vendor in the operation 418.

[0110] For another example, the web server 112 may create a corresponding target order comprising the goods information, the assigned delivery time, the goods attributes, the delivery destination information, the expected delivery time, and the identification data of the first logistics vendor in the operation 418.

[0111] The aforementioned identification data of the first logistics vendor may be realized with different approaches.

[0112] In one embodiment, the first block chain address registered in the block chain subsystem 150 by the aforementioned logistics service subsystem 120 may be utilized to be the identification data of the first logistics vendor. In this situation, the logistics service subsystem 120 may transmit the first block chain address to the web server 112 through the acceptance notice in the aforementioned operation 416, and the web server 112 may utilize the first block chain address to be the identification data of the first logistics vendor in the operation 418.

[0113] In another embodiment, the e-commerce vender may assign different codes to

different logistics vendors so that the codes may be utilized as the identification data for different logistics vendor. For example, the e-commerce vender may assign a first code to the first logistics vendor to be the identification data of the first logistics vendor. In this situation, the logistics service subsystem 120 may transmit the first code to the web server 112 through the acceptance notice in the aforementioned operation 416, and the web server 112 may utilize the first code to be the identification data of the first logistics vendor in the operation 418.

[0114] After creating one or more target orders, the e-commerce vender subsystem 110 may perform the operation 502 of FIG. 5.

[0115] In the operation 502, the web server 112 of the e-commerce vender subsystem 110 may transmit a target order information corresponding to the content of a target order to a corresponding logistics service subsystem.

[0116] For the convenience of description, it is assumed hereinafter that the target order mentioned in the operation 502 is a corresponding target order generated by the web server 112 after the logistics service subsystem 120 accepts a specific delivery request generated by the web server 112. As described previously, the content of the target order may comprise partial content of the corresponding initial order, the corresponding delivery destination information and expected delivery time, and the identification data of the first logistics vendor.

[0117] In this situation, the web server 112 may transmit a target order information comprising the content of the target order to the logistics service subsystem 120 in the operation 502.

[0118] In the operation 504, the communication circuit 122 of the logistics service subsystem 120 receives the target order information generated by the e-commerce vender subsystem 110, and the control circuit 124 may store the target order information in the database 126.

[0119] In the operation 506, the web server 112 or the block chain computing circuit 116 of the e-commerce vender subsystem 110 may transmit an identification data of the target order (hereinafter referred to as a target order identification data), a recipient account, the identification data of the logistics vendor in the target order (hereinafter referred to as a valid vendor identification data), and the delivery destination information in the target order to the block chain subsystem 150.

[0120] As described previously, the content of an initial order corresponding to the target order comprises the recipient information configured by the purchaser, and the recipient information may be or may comprise the recipient's name, the recipient's alias, the recipient's account name, the recipient's phone number, the recipient's identification number, and/or other

information which can be used to identify the identity of the recipient.

[0121] If the initial order comprises the recipient's account name, the web server 112 or the block chain computing circuit 116 may utilize the recipient's account name in the initial order to be the aforementioned recipient account in the operation 506.

[0122] If the initial order does not comprise the recipient's account name, the web server 112 may search for an account name of the corresponding recipient from the database 114 according to the recipient's name, the recipient's alias, the recipient's account name, the recipient's phone number, the recipient's identification number, and/or other information which can be used to identify the identity of the recipient recorded in the initial order, so that the web server 112 or the block chain computing circuit 116 may utilize the account name of the recipient to be the aforementioned recipient account in the operation 506.

[0123] In addition, the web server 112 or the block chain computing circuit 116 may further instruct the block chain subsystem 150 to write the aforementioned information into a recipient smart contract corresponding to a recipient smart contract identification data in the operation 506.

[0124] As described previously, after the web server 112 creates the aforementioned account for the recipient, the web server 112 requests the block chain subsystem 150 to create a corresponding recipient smart contract, and the block chain subsystem 150 transmits a recipient smart contract identification data corresponding to the recipient smart contract to the web server 112.

[0125] Therefore, in the operation 506, the web server 112 or the block chain computing circuit 116 transmits a recipient smart contract identification data corresponding to the aforementioned recipient account to the block chain subsystem 150 so as to instruct the block chain subsystem 150 to write the aforementioned target order identification data, the recipient account, the valid vendor identification data, and the delivery destination information into a recipient smart contract corresponding to the recipient smart contract identification data.

[0126] In the operation 508, the block chain subsystem 150 may receive the target order identification data, the recipient account, the valid vendor identification data, and the delivery destination information transmitted from the e-commerce vender subsystem 110.

[0127] In the operation 510, the block chain subsystem 150 may store the target order identification data, the recipient account, the valid vendor identification data, and the delivery destination information in a recipient smart contract corresponding to the recipient smart contract identification data according to the instruction of the web server 112 or block chain computing circuit 116 so as to form an order event.

[0128] In the operation 512, the block chain subsystem 150 may transmit an order event identification data corresponding to the aforementioned order event to the e-commerce vender subsystem 110.

[0129] In the operation 514, the web server 112 or the block chain computing circuit 116 of the e-commerce vender subsystem 110 may receive the order event identification data transmitted from the block chain subsystem 150, and the web server 112 may store the aforementioned order event identification data in the database 114.

[0130] In the operation 516, the web server 112 of the e-commerce vender subsystem 110 may transmit the order event identification data and the recipient smart contract identification data to the corresponding logistics service subsystem 120.

[0131] In the operation 518, the communication circuit 122 of the logistics service subsystem 120 may receive the aforementioned order event identification data and recipient smart contract identification data, and the control circuit 124 may store the aforementioned information in the database 126.

[0132] In the operation 520, the control circuit 124 of the logistics service subsystem 120 may create a correlation between the aforementioned target order information and the received order event identification data and recipient smart contract identification data.

[0133] In operations, the e-commerce vender subsystem 110, the block chain subsystem 150, and the corresponding logistics service subsystem may repeat the aforementioned operations of FIG. 5 on other target orders generated by the e-commerce vender subsystem 110, so that the related information of other target orders may be stored in the corresponding logistics service subsystems and the block chain subsystem 150.

[0134] Please note that in the operations of FIG. 5 as elaborated above, the information transmitted by the e-commerce vender subsystem 110 to the related logistics service subsystems comprise the target order information, the order event identification data, and the recipient smart contract identification data, but does not need to comprise information which can be used to identify the identity of the recipient. Such approach ensures that the logistics service subsystem 120 is not possible to acquire related information which can be used to identify the identity of the recipient at this stage, so as to prevent the identity of the recipient from leaking due to various manual factors or technical problems, thereby providing a better protection for the privacy of the identity of the recipient.

[0135] The operations that the logistics information management system 100 delivers goods to recipients will be further described below by reference to FIG. 6 through FIG. 11. FIGS. 6~8 collectively show a simplified flowchart of a method for planning a path in a target region

according to one embodiment of the present disclosure. FIGS. 9~11 collectively show a simplified flowchart of a method for positioning the location of a recipient according to one embodiment of the present disclosure.

[0136] As described previously, in the traditional goods delivery mechanism, the logistics vendor may plan a delivery path for the logistician according to the delivery address information in multiple collected orders. In addition, in order to avoid the situations that the recipient is not present to pick up the goods when the logistician arrived the delivery destination, the traditional goods delivery mechanism often requires the logistician to contact different recipients one-by-one in advance to check whether individual recipient is available to receive the goods or not to make sure the goods can be delivered to the given destination at suitable timing, particularly in situations when the goods to be delivered are with special attributes (e.g., fresh food, or cold, frozen products, or the like). Therefore, for the logistician, the traditional goods delivery mechanism not only costs extra communication fee, but is also time-consuming and inconvenient.

[0137] In order to avoid problems in the traditional goods delivery mechanism, the logistics information management system 100 utilizes a different mechanism to plan the delivery path for guiding the logistician. For the convenience of description, the operations of the logistics service subsystem 120 planning the delivery path for the logistician of the first logistics vendor will be taken as an example in the following for describing the operations in FIG. 6 through FIG. 8.

[0138] As shown in FIG. 6, after the control circuit 124 of the logistics service subsystem 120 collects multiple target orders to a predetermined quantity, the control circuit 124 may perform the operation 602.

[0139] In the operation 602, the control circuit 124 may execute a predetermined path planning algorithm according to the expected delivery time, the delivery destination information or the like in the multiple collected target orders to plan multiple initial delivery paths, so that each of the initial delivery paths corresponds to one or more target regions, wherein each of the target regions covers the delivery destinations of multiple collected target orders.

[0140] As described previously, the web server 112 conducts the location de-identification process on the delivery location configured by the purchaser in the aforementioned operation 406 to generate the corresponding delivery destination information which is utilized to represent a delivery destination having a spatial correlation with the delivery location. Apparently, the delivery destination covers a wider geographical area than the corresponding

delivery location.

[0141] Comparing with the traditional goods delivery mechanism where the delivery path is planned according to multiple definite delivery address information, the aforementioned method adopted by the logistics service subsystem 120 for planning the delivery path according to the delivery destination information of multiple target orders effectively reduces the computing loading and complexity required for planning the delivery path.

[0142] In the operation 604, the control circuit 124 may transmit different initial delivery paths to the logistician devices used by different logisticians through the communication circuit 122. For the convenience of description, it is assumed hereinafter that the control circuit 124 transmits one of the multiple initial delivery paths to the logistician device 105 used by the first logistician through the communication circuit 122 in the operation 604.

[0143] In this situation, the logistician device 105 performs the operation 606 to receive the initial delivery path transmitted from the logistics service subsystem 120.

[0144] After the logistician device 105 receives the corresponding initial delivery path, the first logistician may conduct the goods delivery operation following the initial delivery path according to a predetermined schedule by using an appropriate vehicle (e.g., a truck, an automobile, a motorcycle, an aircraft, a boat, or the like).

[0145] During the process in which the first logistician delivers the goods, the logistician device 105 may perform the operation 608 and the operation 610.

[0146] In the operation 608, the logistician device 105 may provide the initial delivery path in an audio and/or video format for the first logistician's reference or to guide the first logistician.

[0147] In the operation 610, the logistician device 105 may track the change of geographical location of the logistician device 105 itself. In operations, the logistician device 105 may adopt various positioning mechanisms to detect the current location of the logistician device 105 and track the change of geographical location of the logistician device 105.

[0148] The logistician device 105 may compare the detected current location of the logistician device 105 with locations or borders of individual target regions on the initial delivery path. When the logistician device 105 approaches a specific target region, that is, when a distance between the location of the logistician device 105 and the location of the target region is shorter than a predetermined distance, the logistician device 105 may perform the operation 612.

[0149] In the operation 612, the logistician device 105 may generate and transmit a target region path planning request corresponding to the specific target region to the logistics service

subsystem 120.

[0150] For example, the logistician device 105 may utilize appropriate data format to integrate a center coordinate, a geographical area information, and/or an identification data of the target region into a target region path planning request in the operation 612, and the logistician device 105 may transmit the target region path planning request to the logistics service subsystem 120.

[0151] In this situation, the communication circuit 122 of the logistics service subsystem 120 may perform the operation 614 to receive the target region path planning request transmitted from the logistician device 105. Then, the control circuit 124 may acquire a corresponding target region information from the content of the received target region path planning request, or the control circuit 124 may convert the content of the received target region path planning request into the corresponding target region information.

[0152] In the operation 616, the control circuit 124 may search for multiple order event identification data of which the corresponding delivery destinations are within the target region.

[0153] As described previously, the control circuit 124 may store the target order information transmitted from the e-commerce vender subsystem 110 in the database 126, and create a correlation between the order event identification data and the target order information transmitted from the e-commerce vender subsystem 110. As a result, the control circuit 124 may respectively compare the delivery destination of the individual target order information stored in the database 126 with the target region in the operation 616 so as to locate multiple target order information of which the corresponding delivery destinations are within the target region. Then, the control circuit 124 may search for multiple corresponding order event identification data from the database 126 according to the multiple target order information.

[0154] Then, the control circuit 124 of the logistics service subsystem 120 performs the operation 702 of FIG. 7 to generate multiple take-over requests respectively corresponding to the aforementioned multiple order event identification data, so that each of the take-over requests comprises a corresponding order event identification data and the identification data of the first logistics vendor.

[0155] For example, the control circuit 124 may utilize appropriate data format to integrate the identification data of the first logistics vendor and a first order event identification data in the aforementioned multiple order event identification data into a first take-over request in the operation 702. The control circuit 124 may utilize appropriate data format to integrate the identification data of the first logistics vendor and a second order event identification data in the aforementioned multiple order event identification data into a second take-over request.

The same analogy applies to other order event identification data.

[0156] As described previously, the control circuit 124 of the logistics service subsystem 120 creates a correlation among the order event identification data transmitted from the e-commerce vender subsystem 110, the recipient smart contract identification data transmitted from the e-commerce vender subsystem 110, and the target order information. As a result, the control circuit 124 may search for the multiple recipient smart contract identification data in the database 126 according to the aforementioned multiple order event identification data.

[0157] In practice, the control circuit 124 may access the block chain subsystem 150 through the communication circuit 122 or the block chain computing circuit 128 to read the content of multiple order events corresponding to the aforementioned multiple recipient smart contract identification data and multiple order event identification data from the block chain subsystem 150, so as to acquire multiple recipient accounts recorded in the multiple order events.

[0158] Then, the control circuit 124 may perform the operation 704 to respectively transmit different take-over requests to different recipient devices through the communication circuit 122.

[0159] In one embodiment, the control circuit 124 may directly transmit the aforementioned multiple take-over requests respectively to multiple recipient devices corresponding to the aforementioned multiple recipient accounts through the communication circuit 122.

[0160] In another embodiment, the control circuit 124 may transmit the aforementioned multiple take-over requests and multiple recipient accounts to the web server 112 of the e-commerce vender subsystem 110 through the communication circuit 122, and request the web server 112 to respectively transmit the multiple take-over requests to the multiple recipient devices corresponding to the aforementioned multiple recipient accounts.

[0161] In operations, the quantity of the take-over requests transmitted by the control circuit 124 to the individual recipient device through the communication circuit 122 may be one or more than one.

[0162] For the convenience of description, it is assumed hereinafter that the control circuit 124 directly or indirectly transmits one of the multiple take-over requests to the recipient device 103 used by the first recipient through the communication circuit 122 in the operation 704.

[0163] In this situation, the processing circuit 162 of the recipient device 103 may perform the operation 706 to receive the take-over request transmitted from the logistics service subsystem 120.

[0164] In the operation 708, the take-over request processing module 220 of the recipient privacy protection program 166 may control the processing circuit 162 to acquire a

corresponding order event identification data and a corresponding current vendor identification data from the take-over request. In normal situations (e.g, in situations where the take-over request is not tampered or forged by malicious people), the current vendor identification data acquired by the processing circuit 162 is supposed to be the identification data of the first logistics vendor. For the convenience of description below, the current vendor identification data acquired by the processing circuit 162 in the operation 708 is hereinafter referred to as a first current vendor identification data.

[0165] In the operation 710, the processing circuit 162 may generate and transmit a delivery destination information request comprising the aforementioned order event identification data and first current vendor identification data to the block chain subsystem 150.

[0166] For example, in the operation 710, the take-over request processing module 220 may control the processing circuit 162 to log in to the web server 112 of the e-commerce vender subsystem 110 with the first recipient account, and to transmit the aforementioned delivery destination information request to the web server 112. Then the web server 112 or the block chain computing circuit 116 logs in to the block chain subsystem 150 with the corresponding e-commerce vender subsystem PA of the e-commerce vender subsystem 110 so as to transmit the delivery destination information request to the block chain subsystem 150. In other words, the recipient device 103 may indirectly transmit the aforementioned delivery destination information request to the block chain subsystem 150 through the e-commerce vender subsystem 110. That is, the e-commerce vender subsystem 110 may be utilized as an intermediate for the recipient device 103 to access the block chain subsystem 150.

[0167] In the operation 712, the block chain subsystem 150 receives the delivery destination information request transmitted from the recipient device 103, and acquires an order event identification data and a first current vendor identification data from the delivery destination information request.

[0168] In the operation 714, the block chain subsystem 150 searches for a corresponding order event according to the order event identification data, and reads the content of the order event.

[0169] In the operation 716, the block chain subsystem 150 compares the first current vendor identification data with the valid vendor identification data recorded in the order event to determine whether the first current vendor identification data matches the valid vendor identification data or not. If the first current vendor identification data does not match the valid vendor identification data, the block chain subsystem 150 performs the operation 718. On the contrary, if the first current vendor identification data matches the valid vendor identification

data, the block chain subsystem 150 performs the operation 722.

[0170] In the operation 718, the block chain subsystem 150 transmits a rejection notice to the recipient device 103. In this situation, the recipient device 103 performs the operation 720 to receive the rejection notice transmitted from the block chain subsystem 150.

[0171] In practice, the block chain subsystem 150 may transmit the rejection notice to the web server 112 or the block chain computing circuit 116 of the e-commerce vender subsystem 110 in the operation 718, and then the e-commerce vender subsystem 110 may transmit the rejection notice to a recipient device corresponding to the first recipient account (e.g., the recipient device 103 in this embodiment).

[0172] In the operation 722, the block chain subsystem 150 transmits a delivery destination information recorded in the order event to the recipient device 103. In this situation, the recipient device 103 performs the operation 724 to receive the delivery destination information transmitted from the block chain subsystem 150.

[0173] In practice, the block chain subsystem 150 may transmit the delivery destination information to the web server 112 or the block chain computing circuit 116 of the e-commerce vender subsystem 110 in the operation 722, and then the delivery destination information may be transmitted to the recipient device 103 corresponding to the first recipient account by the web server 112.

[0174] As shown in FIG. 8, after the recipient device 103 receives the aforementioned delivery destination information, the take-over request processing module 220 of the recipient privacy protection program 166 controls the processing circuit 162 to perform the operation 802.

[0175] In the operation 802, the processing circuit 162 determines whether a current location of the recipient device 103 is within a delivery destination corresponding to the aforementioned delivery destination information or not. In operations, the processing circuit 162 may adopt various positioning mechanisms to detect the current location of the recipient device 103. For the convenience of description, the current location of the recipient device 103 when the processing circuit 162 performs the operation 802 is hereinafter referred to as a first current location.

[0176] If the processing circuit 162 determines that the first current location is within the delivery destination, the take-over request processing module 220 of the recipient privacy protection program 166 performs the operation 804. On the contrary, if the processing circuit 162 determines that the first current location is not within the delivery destination, the take-over request processing module 220 performs the operation 810.

[0177] In the operation 804, the take-over request processing module 220 controls the processing circuit 162 to generate an inquiry message, and provides the inquiry message in audio and/or video format to inquire whether the first recipient intends to receive goods or not.

[0178] In practice, the processing circuit 162 may inform the first recipient of the information related to the goods to be received such as the goods name, the purchaser information, the recipient information, the e-commerce vender information, and/or the logistics vendor information in the inquiry message. The aforementioned information related to the goods to be received may be acquired by the recipient device 103 by inquiring the e-commerce vender subsystem 110, the logistics service subsystem 120, and/or the block chain subsystem 150, or may be provided to the recipient device 103 by the e-commerce vender subsystem 110, the logistics service subsystem 120, and/or the block chain subsystem 150 in the previous stages.

[0179] If the first recipient adopts various appropriate methods (e.g., sliding specific graphs, clicking specific graphs, inputting texts or instructions, issuing specific verbal commands, shaking the recipient device 103, or conducting other specific manipulation on the recipient device 103) to issue an instruction to the recipient device 103 indicating that he or she intends to receive the goods, the take-over request processing module 220 performs the operation 806. On the contrary, if the first recipient issues an instruction to the recipient device 103 indicating that he or she does not intend to receive the goods, the take-over request processing module 220 performs the operation 810.

[0180] In the operation 806, the take-over request processing module 220 controls the processing circuit 162 to generate and transmit an available-to-receive notice to the logistics service subsystem 120. Please note that in order to prevent the information of the current location of the first recipient from leaking, the aforementioned available-to-receive notice generated by the processing circuit 162 does not comprise the information of the current location of the recipient device 103 (that is, the aforementioned first current location).

[0181] In the operation 808, the communication circuit 122 of the logistics service subsystem 120 receives the available-to-receive notice transmitted from the recipient device 103.

[0182] In the operation 810, the take-over request processing module 220 controls the processing circuit 162 to generate and transmit an unavailable-to-receive notice to the logistics service subsystem 120.

[0183] In the operation 812, the communication circuit 122 of the logistics service subsystem 120 receives the unavailable-to-receive notice transmitted from the recipient device

103.

[0184] As described previously, the logistics service subsystem 120 transmits the multiple different take-over requests corresponding to the aforementioned target region to different recipient devices. After receiving the corresponding take-over request, each of the recipient devices may adopt the method as elaborated in the operation 706 through the operation 810 to utilize the block chain subsystem 150 to verify whether the related logistics vendor identification data is correct or not, to determine whether the current location of the recipient device is within the corresponding delivery destination or not, and to determine whether the related recipient intends to receive the goods or not, and then generate and transmit a related available-to-receive notice or an unavailable-to-receive notice to the corresponding logistics service subsystem.

[0185] For the convenience of description, it is assumed hereinafter that the logistics service subsystem 120 successively receives multiple available-to-receive notices transmitted from multiple different recipient devices which locate within the target region by adopting the aforementioned approach. In this situation, the control circuit 124 of the logistics service subsystem 120 may perform the operation 814.

[0186] In the operation 814, the control circuit 124 of the logistics service subsystem 120 may plan a target region delivery path corresponding to the target region based on multiple delivery destinations corresponding to the multiple available-to-receive notices. In practice, the control circuit 124 may execute various appropriate path planning algorithms to plan a target region delivery path which passes or comprises the multiple delivery destinations.

[0187] In the operation 816, the control circuit 124 may transmit the target region delivery path to the corresponding logistician device 105 through the communication circuit 122.

[0188] In this situation, the logistician device 105 performs the operation 818 to receive the target region delivery path transmitted from the logistics service subsystem 120, and to provide the target region delivery path in audio and/or video format for the first logistician's reference or to guide the first logistician.

[0189] Then, the first logistician may manipulate the vehicle to conduct the goods delivery operation following the aforementioned target region delivery path.

[0190] As can be appreciated from the aforementioned descriptions, the logistics service subsystem 120 does not need to acquire specific individual delivery address or detailed recipient information in advance. The logistics service subsystem 120 is enabled to plan the corresponding target region delivery path solely based on the aforementioned multiple delivery destinations. Such method of planning the delivery path effectively prevents the individual

recipient's information and delivery address from leaking, thus it provides a better protection for the privacy of the recipient.

[0191] In addition, the logistics service subsystem 120 plans the target region delivery path based on the multiple delivery destinations, not based on multiple specific addresses, therefore the computing loading and computing complexity required for planning the delivery path can be reduced.

[0192] Furthermore, the first logistician does not need to contact different recipients one-by-one in advance. Instead, the first logistician is enabled to automatically inquire the multiple different recipients within the target region whether they intend to receive the goods or not through the cooperation among the aforementioned logistics service subsystem 120, block chain subsystem 150, and multiple recipient devices. If the current location of a recipient device is actually not within the corresponding delivery destination, the recipient device may automatically transmit the unavailable-to-receive notice to the logistics service subsystem 120, so as to prevent the possibility that the recipient intentionally lies about being available to pick up the goods while the recipient presently is not within the delivery destination and thus causing the first logistician to waste time in making an unsuccessful delivery. Such approach effectively saves a vast amount of operation time of the first logistician, and eliminates the possibility that the first logistician being deceived, thereby significantly improving the efficiency in goods delivery.

[0193] On the other hand, the recipient device 103 compares the current location of the recipient device 103 with the delivery destination which covers a wider geographical area, not with a specific delivery location, in the aforementioned operation 802. Therefore, before the logistician arrives at the location of the first recipient, as long as the recipient device 103 determines that the current location of the recipient device 103 is within the delivery destination and that the first recipient intends to receive the goods, the recipient device 103 is enabled to transmit an available-to-receive notice to the logistics service subsystem 120.

[0194] In other words, the method for planning a path in a target region provided in the aforementioned FIG. 6 through FIG. 8 does not require the first recipient to stay at the actual delivery location all the time before the logistician arrives at the location of the first recipient. Therefore, before the logistician arrives at the actual delivery location, the aforementioned method for planning the path in the target region allows the first recipient to walk or move around the delivery location, so that the first recipient is enabled to enjoy a wider activity range and greater moving flexibility.

[0195] Furthermore, the recipient device 103 does not need to report the location of the first

recipient or a real-time positioning information of the recipient device 103 to the logistics service subsystem 120 in the aforementioned operations, and thus the aforementioned method prevents the possibility of the location of the first recipient from leaking due to human error or technical problems.

[0196] In operations, other logistics service subsystems (e.g., the logistics service subsystem 130) in the logistics information management system 100 may plan the delivery path for the logisticians of the related logistics vendor according to the method adopted by the logistics service subsystem 120 as described in the aforementioned FIG. 6 through FIG. 8.

[0197] The operations of the logistics information management system 100 during the period in which the logistician follows the aforementioned target region delivery path to deliver goods will be further described in the following by reference to FIGS. 9~11. FIGS. 9~11 collectively show a simplified flowchart of a method for positioning the location of a recipient according to one embodiment of the present disclosure.

[0198] For the convenience of description, the operations of how the aforementioned first logistician delivers goods following the target region delivery path will be taken as an example in the following for describing the operations of the logistics information management system 100 at this stage.

[0199] As shown in FIG. 9, during the period in which the first logistician manipulates the vehicle to conduct the goods delivery following the aforementioned target region delivery path, the logistician device 105 performs the operation 902 of FIG. 9 to detect and track the change of geographical location of the logistician device 105. In operations, the logistician device 105 may adopt various positioning mechanisms to detect the current location of the logistician device 105 and track the change of geographical location of the logistician device 105.

[0200] As described previously, there are multiple delivery destinations on the target region delivery path, and individual delivery destination has a spatial correlation with individual delivery location configured by different purchasers.

[0201] In normal situations, the first logistician will visit different delivery destinations on the target region delivery path according to a predetermined sequence to deliver related goods to one or more recipients at the respective delivery destinations.

[0202] In the aforementioned operation 902, the logistician device 105 may compare the detected current location of the logistician device 105 with respective delivery destinations on the target region delivery path. When the logistician device 105 approaches a specific delivery destination, that is, when a distance between the location of the logistician device 105 and the delivery destination is shorter than a predetermined distance, the logistician device 105 may

perform the operation 904.

[0203] In the operation 904, the logistician device 105 may generate and transmit a position information inquiry corresponding to the delivery destination to the corresponding logistics service subsystem 120. For example, the logistician device 105 may utilize appropriate data format to integrate a center coordinate of the delivery destination, a geographical area information of the delivery destination, and/or an identification data of the delivery destination into a corresponding position information inquiry, and the logistician device 105 may transmit the position information inquiry to the logistics service subsystem 120 in the operation 904.

[0204] In this situation, the communication circuit 122 of the logistics service subsystem 120 may perform the operation 906 to receive the position information inquiry transmitted from the logistician device 105. The control circuit 124 may acquire a corresponding delivery destination information from the content of the received position information inquiry, or convert the content of the position information inquiry into a corresponding delivery destination information. Then, the control circuit 124 may search for a specific target order information corresponding to the delivery destination information from the database 126. For the convenience of description, it is assumed hereinafter that the aforementioned specific target order information instructs the first logistics vendor to deliver a target goods to the aforementioned first recipient.

[0205] Then, the control circuit 124 may perform the operation 908 to generate a position information request comprising a specific order event identification data corresponding to the aforementioned specific target order information and the identification data of the first logistics vendor, and to transmit the position information request to a corresponding recipient device.

[0206] As described previously, the control circuit 124 of the logistics service subsystem 120 creates a correlation among the order event identification data transmitted from the e-commerce vender subsystem 110, the recipient smart contract identification data transmitted from the e-commerce vender subsystem 110, and the target order information. Therefore, the control circuit 124 may search the database 126 for a corresponding order event identification data based on the specific target order information, utilize the order event identification data to be the specific order event identification data, and search the database 126 for a recipient smart contract identification data corresponding to the first recipient in the operation 908.

[0207] In practice, the control circuit 124 may access the block chain subsystem 150 through the communication circuit 122 or the block chain computing circuit 128 to read the content of an order event corresponding to the aforementioned recipient smart contract identification data and the order event identification data from the block chain subsystem 150, so as to acquire the

recipient account recorded in the order event.

[0208] In the aforementioned operation 908, the control circuit 124 may directly transmit the position information request to a recipient device corresponding to the aforementioned recipient account (e.g., the recipient device 103 used by the first recipient in this embodiment) through the communication circuit 122.

[0209] Alternatively, the control circuit 124 may transmit the position information request and the recipient account to the web server 112 of the e-commerce vender subsystem 110 through the communication circuit 122 in the aforementioned operation 908, and request the web server 112 to transmit the position information request to a recipient device corresponding to the recipient account (e.g., the recipient device 103 used by the first recipient in this embodiment).

[0210] In other words, the control circuit 124 may directly or indirectly transmit the position information request to the recipient device 103 used by the first recipient through the communication circuit 122 in the operation 908.

[0211] In this situation, the processing circuit 162 of the recipient device 103 may perform the operation 910 to receive the position information request transmitted from the logistics service subsystem 120.

[0212] In the operation 912, the position request processing module 230 of the recipient privacy protection program 166 may control the processing circuit 162 to acquire a corresponding order event identification data and a corresponding current vendor identification data from the position information request. In normal situations (e.g., in situations where the position information request is not tampered or forged by malicious people), the current vendor identification data acquired by the processing circuit 162 is supposed to be the identification data of the first logistics vendor. For the convenience of following description, the current vendor identification data acquired by the processing circuit 162 in the operation 912 is hereinafter referred to as a second current vendor identification data.

[0213] In the operation 914, the processing circuit 162 may generate and transmit a logistics vendor identity authentication request comprising the aforementioned order event identification data and second current vendor identification data to the block chain subsystem 150.

[0214] For example, in the operation 914, the position request processing module 230 may control the processing circuit 162 to log in to the web server 112 of the e-commerce vender subsystem 110 with the first recipient account, and to transmit the aforementioned logistics vendor identity authentication request to the web server 112. Then the web server 112 or the

block chain computing circuit 116 logs in to the block chain subsystem 150 with the corresponding e-commerce vender subsystem PA of the e-commerce vender subsystem 110 so as to transmit the logistics vendor identity authentication request to the block chain subsystem 150. In other words, the recipient device 103 may indirectly transmit the aforementioned logistics vendor identity authentication request to the block chain subsystem 150 through the e-commerce vender subsystem 110. That is, the e-commerce vender subsystem 110 may be utilized as an intermediate for the recipient device 103 to access the block chain subsystem 150.

[0215] In the operation 916, the block chain subsystem 150 receives the logistics vendor identity authentication request transmitted from the recipient device 103, and acquires an order event identification data and a second current vendor identification data from the logistics vendor identity authentication request.

[0216] Then, the block chain subsystem 150 performs the operation 1002 of FIG. 10 to search for a corresponding order event according to the order event identification data, and to read the content of the order event.

[0217] In the operation 1004, the block chain subsystem 150 compares the second current vendor identification data with the valid vendor identification data recorded in the order event to determine whether the second current vendor identification data matches the valid vendor identification data or not. If the second current vendor identification data does not match the valid vendor identification data, the block chain subsystem 150 performs the operation 1006. On the contrary, if the second current vendor identification data matches the valid vendor identification data, the block chain subsystem 150 performs the operation 1012.

[0218] In the operation 1006, the block chain subsystem 150 generates and transmits an identity authentication failure notice to the recipient device 103. In this situation, the position request processing module 230 controls the processing circuit 162 to perform the operation 1008 to receive the identity authentication failure notice transmitted from the block chain subsystem 150.

[0219] In practice, the block chain subsystem 150 may transmit the identity authentication failure notice to the web server 112 or the block chain computing circuit 116 of the e-commerce vender subsystem 110 in the operation 1006, and then the e-commerce vender subsystem 110 may transmit the identity authentication failure notice to a recipient device corresponding to the first recipient account (e.g., the recipient device 103 in this embodiment).

[0220] In the operation 1010, the position request processing module 230 controls the processing circuit 162 to generate and transmit a rejection notice to the logistics service subsystem 120 to reject the position information request transmitted from the logistics service

subsystem 120.

[0221] In the operation 1012, the block chain subsystem 150 generates and transmits an identity authentication successful notice to the recipient device 103.

[0222] In this situation, the position request processing module 230 controls the processing circuit 162 to perform the operation 1014 to receive the identity authentication successful notice transmitted from the block chain subsystem 150.

[0223] In practice, the block chain subsystem 150 may transmit the identity authentication successful notice to the web server 112 or the block chain computing circuit 116 of the e-commerce vender subsystem 110 in the operation 1012, and then the e-commerce vender subsystem 110 may transmit the identity authentication successful notice to the recipient device 103 corresponding to the first recipient account.

[0224] In the operation 1016, the encryption module 240 of the recipient privacy protection program 166 controls the processing circuit 162 to utilize a cipher key to encrypt the current location of the recipient device 103, so as to generate an encrypted recipient position.

[0225] In operations, the processing circuit 162 may adopt various positioning mechanisms to detect the current location of the recipient device 103. For the convenience of following description, the current location of the recipient device 103 when the processing circuit 162 performs the operation 1016 is hereinafter referred to as a second current location. The processing circuit 162 may utilize the cipher key to execute various appropriate encryption algorithms on the aforementioned second current location to generate the aforementioned encrypted recipient position in the operation 1016.

[0226] Then, the encryption module 240 controls the processing circuit 162 to perform the operation 1102 of FIG. 11.

[0227] In the operation 1102, the encryption module 240 controls the processing circuit 162 to transmit the cipher key to the logistics service subsystem 120 in response to the position information request transmitted from the aforementioned logistics service subsystem 120 in the operation 908.

[0228] In this situation, the communication circuit 122 of the logistics service subsystem 120 may perform the operation 1104 to receive the cipher key transmitted from the recipient device 103. The control circuit 124 may create a correlation among the cipher key, the order event identification data corresponding to the specific position information request, and the recipient smart contract identification data corresponding to the specific order event identification data.

[0229] In the operation 1106, the control circuit 124 of the logistics service subsystem 120

may generate a recipient position information request corresponding to the received cipher key, and transmit the recipient position information request to the block chain subsystem 150 through the communication circuit 122 or the block chain computing circuit 128. In practice, the control circuit 124 may generate a recipient position information request comprising the aforementioned specific order event identification data and the corresponding recipient smart contract identification data, and transmit the recipient position information request to the block chain subsystem 150. In this embodiment, for example, the aforementioned recipient smart contract identification data is the identification data of the recipient smart contract corresponding to the first recipient, and the aforementioned specific order event identification data is the identification data of an order event corresponding to the aforementioned specific target order information.

[0230] In the operation 1108, the block chain subsystem 150 may receive and record the recipient position information request transmitted from the logistics service subsystem 120. In operations, the block chain subsystem 150 may extract the specific order event identification data and the corresponding recipient smart contract identification data from the recipient location information request, and record the recipient position information request in an order event corresponding to the recipient smart contract identification data and the specific order event identification data.

[0231] In the operation 1110, the block chain subsystem 150 may generate an encrypted position information request corresponding to the recipient position information request, and transmit the encrypted position information request to a recipient device corresponding to the specific order event identification data (e.g., the recipient device 103 used by the first recipient in this embodiment). In this situation, the recipient device 103 performs the operation 1112 to receive the encrypted position information request transmitted from the block chain subsystem 150.

[0232] In practice, the block chain subsystem 150 may transmit the encrypted position information request to the web server 112 or the block chain computing circuit 116 of the e-commerce vender subsystem 110 in the operation 1110, and then the web server 112 may transmit the encrypted position information request to the recipient device 103.

[0233] In the operation 1114, the encryption module 240 of the recipient privacy protection program 166 controls the processing circuit 162 to transmit the aforementioned encrypted recipient position generated in the operation 1016 to the block chain subsystem 150.

[0234] For example, in the operation 1114, the encryption module 240 may control the processing circuit 162 to log in to the web server 112 of the e-commerce vender subsystem 110

with the first recipient account, and to transmit the encrypted recipient position to the web server 112. Then, the web server 112 or the block chain computing circuit 116 may log in to the block chain subsystem 150 with the corresponding e-commerce vender subsystem PA of the e-commerce vender subsystem 110 so as to transmit the encrypted recipient position to the block chain subsystem 150. In other words, the recipient device 103 may indirectly transmit the encrypted recipient position to the block chain subsystem 150 through the e-commerce vender subsystem 110.

[0235] In the operation 1116, the block chain subsystem 150 receives the encrypted recipient position transmitted from the recipient device 103, and records the received encrypted recipient position in a corresponding order event in the recipient smart contract corresponding to the first recipient account (that is, the order event corresponding to the aforementioned specific order event identification data).

[0236] In the operation 1118, the block chain subsystem 150 generates and transmits a position information available notice to the logistics service subsystem 120 in response to the recipient position information request transmitted from the logistics service subsystem 120 in the operation 1106.

[0237] In this situation, the communication circuit 122 of the logistics service subsystem 120 performs the operation 1120 to receive the position information available notice transmitted from the block chain subsystem 150.

[0238] Then, the control circuit 124 of the logistics service subsystem 120 may perform the operation 1122 to access the block chain subsystem 150 through the communication circuit 122 or the block chain computing circuit 128, and to read the content of an order event corresponding to the aforementioned recipient smart contract identification data and the specific order event identification data from the block chain subsystem 150, so as to acquire the encrypted recipient position recorded in the order event.

[0239] In the operation 1124, the control circuit 124 may utilize the received cipher key to decrypt the encrypted recipient position read from the block chain subsystem 150, so as to acquire the current location of the first recipient.

[0240] If one or more items among the cipher key transmitted from the recipient device 103 to the logistics service subsystem 120, the specific order event identification data utilized by the logistics service subsystem 120, the recipient smart contract identification data utilized by the logistics service subsystem 120, and the encrypted recipient position read from the block chain subsystem 150 are incorrect, the control circuit 124 is not possible to utilize the cipher key to decrypt the encrypted recipient position, thus the control circuit 124 is unable to acquire

the current location of the first recipient.

[0241] On the contrary, if the cipher key transmitted from the recipient device 103 to the logistics service subsystem 120, the specific order event identification data utilized by the logistics service subsystem 120, the recipient smart contract identification data utilized by the logistics service subsystem 120, and the encrypted recipient position read from the block chain subsystem 150 are all correct, the control circuit 124 is enabled to utilize the cipher key to decrypt the encrypted recipient position in the operation 1124 so as to acquire the current location of the first recipient (that is, the aforementioned second current location).

[0242] In this situation, the control circuit 124 of the logistics service subsystem 120 may perform the operation 1126 to transmit a current location information of the first recipient to the corresponding logistician device 105 through the communication circuit 122, so as to instruct the corresponding first logistician to conduct goods delivery.

[0243] Since the logistics service subsystem 120 transmits the current location information of the first recipient to the logistician device 105, the first logistician is enabled to get the current location of the first recipient. As a result, the first logistician is able to deliver the related goods to the first recipient.

[0244] In practical applications, the logistics service subsystem 120 may conduct interaction with other recipient devices within the target region by adopting the method as described in the aforementioned FIG. 9 through FIG. 11, so as to acquire and provide current location information of other recipients to the logistician device 105, so that the first logistician can get informed of the current location of other recipients.

[0245] As can be appreciated from the aforementioned descriptions, during the process in which the first logistician delivers the goods to the first recipient, the first logistician is enabled to automatically acquire the current location of the first recipient (that is, the aforementioned second current location) through the corresponding logistics service subsystem 120 without contacting the first recipient in advance. Such approach saves the first logistician's operation time and improve the efficiency in goods delivery.

[0246] In addition, the recipient device 103 may utilize the block chain subsystem 150 to verify whether the identity of the logistics vendor corresponding to the position information request is correct or not, therefore it prevents the current location of the first recipient from being erroneously transmitted to wrong logisticians.

[0247] Moreover, the recipient device 103 would transmit the cipher key to the logistics service subsystem 120, but does not directly transmit the encrypted recipient position to the logistics service subsystem 120. Instead, the recipient device 103 transmits the encrypted

recipient position to the block chain subsystem 150 for storage. The logistics service subsystem 120 is enabled to successfully utilize the received cipher key to decrypt the encrypted recipient position, so as to acquire and transmit the current location of the first recipient to the logistician device 105 only in the case of that the cipher key transmitted from the recipient device 103 to the logistics service subsystem 120, the specific order event identification data utilized by the logistics service subsystem 120, the recipient smart contract identification data utilized by the logistics service subsystem 120, and the encrypted recipient position read from the block chain subsystem 150 are all correct. Such approach effectively reduces the possibility of leakage of the current location of the first recipient due to being stolen by malicious people. In addition, the block chain subsystem 150 also saves all access records of the encrypted recipient position. Accordingly, a much higher level of protection for the privacy of the real-time location information of the recipient can be achieved.

[0248] As can be appreciated from the aforementioned descriptions, if disputes occur in the future when the specific recipient alleges that his or her delivery location was leaked, the operator of the e-commerce vender subsystem 110 may log in to the block chain subsystem 150 with the e-commerce vender subsystem PA to inquire the access records stored in the block chain subsystem 150 with respect to all order events in the recipient smart contract corresponding to the recipient. In operations, the block chain subsystem 150 records all encrypted recipient positions corresponding to the recipient in individual order event, and records all access actions with respect to these encrypted recipient positions. Due to the technical characteristics of the block chain subsystem 150, it is very difficult for malicious person to tamper the aforementioned access records stored in the block chain subsystem 150. Therefore, the operator of the e-commerce vender subsystem 110 and/or other logistics vendors are enabled to figure out who had accessed the encrypted recipient positions corresponding to the recipient and when the encrypted recipient positions were accessed according to the records stored in the block chain subsystem 150, so as to clarify whether the delivery location of the recipient was leaked or not, and/or to inspect who should be responsible for the leakage.

[0249] Please note that the execution order of the aforementioned operations in each flowchart is merely an exemplary embodiment, rather than a restriction to the practical implementations. For example, the operation 312 of FIG. 3 may be performed prior to the operations 302, or alternatively, the operations 302 and 312 may be performed at the same time. For another example, the operation 322 of FIG. 3 may be performed prior to the operation 312, or alternatively, the operations 312 and 322 may be performed at the same time. For another example, the operation 332 of FIG. 3 may be performed prior to the operation 328, or

alternatively, the operations 332 and 328 may be performed at the same time. For another example, the operation 406 of FIG. 4 may be performed prior to the operation 404, or alternatively, the operations 404 and 406 may be performed at the same time. For another example, the operation 506 of FIG. 5 may be performed prior to the operation 502, or alternatively, the operations 502 and 506 may be performed at the same time. For another example, the operation 804 of FIG. 8 may be performed prior to the operation 802, or alternatively, the operations 802 and 804 may be performed at the same time. For another example, the operation 1016 of FIG. 10 may be performed after the operation 1102 of FIG. 11, or alternatively, the operation 1016 may be performed between the operation 1112 and the operation 1114.

[0250] In addition, as described previously, the recipient device 103 may indirectly transmit the aforementioned delivery destination information request and the logistics vendor identity authentication request to the block chain subsystem 150 through the e-commerce vender subsystem 110. In this situation, the operation 342 and the operation 344 of FIG. 3 may be omitted.

[0251] In some embodiments, individual recipient may utilize his/her recipient device to register on the block chain subsystem 150, so as to obtain the authorization to directly access the block chain subsystem 150. For example, the first recipient may utilize the recipient device 103 to register on the block chain subsystem 150 in advance. As a result, in the aforementioned operations 710, 720, 724, 914, 1008, 1014, and/or 1114, the recipient device 103 is enabled to access the block chain subsystem 150 without utilizing the e-commerce vender subsystem 110 as an intermediate.

[0252] In some embodiments, the e-commerce vender subsystem 110 may temporarily provide its e-commerce vender subsystem PA in a specific time period to the recipient device, so that the recipient device may utilize the e-commerce vender subsystem PA of the e-commerce vender subsystem 110 to directly access the block chain subsystem 150. For example, the e-commerce vender subsystem 110 may provide its e-commerce vender subsystem PA to the recipient device 103. As a result, in the aforementioned operations 710, 720, 724, 914, 1008, 1014, and/or 1114, the recipient device 103 may log in to the block chain subsystem 150 with the e-commerce vender subsystem PA of the e-commerce vender subsystem 110 so as to directly access the block chain subsystem 150.

[0253] In some embodiments, the e-commerce vender subsystem 110 may further configure a status of each order event recorded in the recipient smart contract in the block chain subsystem 150 to be active or inactive, so that the block chain subsystem 150 may determine

whether to respond to a request with respect to the order event according to the status of the order event.

[0254] For example, in the aforementioned operations of FIG. 7, if the status of the order event is active, the block chain subsystem 150 may transmit a rejection notice or a delivery destination information in response to the request transmitted from the recipient device with respect to the order event. On the contrary, if the status of the order event is inactive, after the block chain subsystem 150 receives the request transmitted from the recipient device with respect to the order event, the block chain subsystem 150 may simply make no response.

[0255] For another example, in the aforementioned operations of FIG. 10, if the status of the order event is active, the block chain subsystem 150 may transmit an identity authentication successful notice or an identity authentication failure notice in response to the request transmitted from the recipient device with respect to the order event. On the contrary, if the status of the order event is inactive, after the block chain subsystem 150 receives the request transmitted from the recipient device with respect to the order event, the block chain subsystem 150 may simply make no response.

[0256] For another example, in the aforementioned operations of FIG. 11, if the status of the order event is active, the block chain subsystem 150 may respond to the recipient position information request transmitted from the logistics service subsystem. On the contrary, if the status of the order event is inactive, after the block chain subsystem 150 receives the recipient position information request transmitted from the logistics service subsystem, the block chain subsystem 150 may simply make no response.

[0257] Therefore, the e-commerce vender subsystem 110 may be arranged to configure the status of the corresponding order event to be active during the period in which the logistics vendor conducts goods delivery, and to configure the status of the corresponding order event to be inactive after the goods delivery is completed. As a result, such approach prevents the situation that the block chain subsystem 150 transmits the encrypted recipient position to any logistics service subsystem during a time period in which the logistics vendor does not conduct goods delivery and causes a leakage of the recipient's location privacy.

[0258] In some embodiments, the take-over request processing module 220 may be arranged to operably determine directly that the first current vendor identification data cannot pass the identity authentication of the block chain subsystem 150 in the situation where the block chain subsystem 150 does not make response to the delivery destination information request generated by the recipient device 103 within a predetermined time period. In this situation, the operations 718 and 720 of FIG. 7 may be omitted.

[0259] In some embodiments, the take-over request processing module 220 may be arranged to operably assume the recipient intends to receive goods in the aforementioned operations of FIG. 8. In this situation, the operation 804 of FIG. 8 may be omitted.

[0260] In some embodiments, the operations 722 and 724 of FIG. 7 and the operation 802 of FIG. 8 may be omitted. In this situation, the block chain subsystem 150 may directly transmit a confirmation notice to the recipient device 103 in the situation where the block chain subsystem 150 determines that the first current vendor identification data matches the valid vendor identification data in the operation 716 of FIG. 7. The recipient device 103 may proceed to perform the operation 804 of FIG. 8 after receiving the confirmation notice.

[0261] In other embodiments, the operations 722 and 724, and the operations 802 and 804 of FIG. 8 may be omitted. In this situation, the block chain subsystem 150 may directly transmit a confirmation notice to the recipient device 103 in the situation where the block chain subsystem 150 determines that the first current vendor identification data matches the valid vendor identification data in the aforementioned operation 716 of FIG. 7. The recipient device 103 may proceed to perform the operation 806 of FIG. 8 after receiving the confirmation notice.

[0262] In another embodiment, the logistics service subsystem 120 may be arranged to operably determine directly that the first recipient corresponding to the recipient device 103 is unavailable to receive goods in the situation where the recipient device 103 does not make response to the take-over request transmitted from the logistics service subsystem 120 within a predetermined time period. In this situation, the operations 810 and 812 of FIG. 8 may be omitted.

[0263] In some embodiments, the position request processing module 230 may be arranged to operably determine directly that the second current vendor identification data cannot pass the identity authentication of the block chain subsystem 150 in the situation where the block chain subsystem 150 does not make response to the logistics vendor identity authentication request generated by the recipient device 103 within a predetermined time period. In this situation, the operations 1006 and 1008 of FIG. 10 may be omitted. Furthermore, the operation 1010 may be omitted.

[0264] Certain terms are used throughout the description and the claims to refer to particular components. One skilled in the art appreciates that a component may be referred to as different names. This disclosure does not intend to distinguish between components that differ in name but not in function. In the description and in the claims, the term “comprise” is used in an open-ended fashion, and thus should be interpreted to mean “include, but not limited to.” The term “couple” is intended to compass any indirect or direct connection. Accordingly, if this

disclosure mentioned that a first device is coupled with a second device, it means that the first device may be directly or indirectly connected to the second device through electrical connections, wireless communications, optical communications, or other signal connections with/without other intermediate devices or connection means.

[0265] The term “and/or” may comprise any and all combinations of one or more of the associated listed items. In addition, the singular forms “a,” “an,” and “the” herein are intended to comprise the plural forms as well, unless the context clearly indicates otherwise.

[0266] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention indicated by the following claims.

CLAIMS

What is claimed is:

1. A logistics information management system (100), comprising:
 - a block chain subsystem (150), comprising multiple block chain nodes (141~147);
 - a logistics service subsystem (120), arranged to operably generate a take-over request comprising a first current vendor identification data and an order event identification data when a logistician device (105) approaches a target region; and
 - a recipient device (103), arranged to operably receive the take-over request, and to operably generate a delivery destination information request comprising the order event identification data and the first current vendor identification data according to the take-over request;

wherein the block chain subsystem (150) is arranged to operably receive the delivery destination information request, to operably search for an order event recorded in a recipient smart contract stored in the block chain subsystem (150) according to the order event identification data, and to operably read a valid vendor identification data from the order event;

wherein if the first current vendor identification data matches the valid vendor identification data, the block chain subsystem (150) reads a delivery destination information from the order event;

wherein the recipient device (103) is further arranged to operably generate and transmit an available-to-receive notice to the logistics service subsystem (120) after receiving the delivery destination information;

wherein the logistics service subsystem (120) is further arranged to operably generate and transmit a position information request comprising a second current vendor identification data and the order event identification data to the recipient device (103) when the logistician device (105) approaches a delivery destination indicated in the delivery destination information;

wherein the recipient device (103) is further arranged to operably receive the position information request, and to operably generate a logistics vendor identity authentication request comprising the second current vendor identification data and the order event identification data according to the position information request;

wherein the block chain subsystem (150) is further arranged to operably receive the logistics vendor identity authentication request, to operably search for the order event recorded in the recipient smart contract stored in the block chain subsystem (150) according to the order event identification data in the logistics vendor identity authentication request, and to operably read the valid vendor identification data from the order event;

wherein the block chain subsystem (150) generates an identity authentication successful notice only if the second current vendor identification data matches the valid vendor identification data;

wherein the recipient device (103) is further arranged to operably utilize a cipher key to encrypt a second current location of the recipient device (103) after receiving the identity authentication successful notice so as to generate an encrypted recipient position.

2. The logistics information management system (100) of claim 1, wherein the recipient device (103) is further arranged to operably determine whether a first current location where the recipient device (103) receives the delivery destination information is within the delivery destination, and to operably transmit the available-to-receive notice to the logistics service subsystem (120) only if the first current location is within the delivery destination.

3. The logistics information management system (100) of claim 2, wherein the recipient device (103) is further arranged to operably generate an inquiry message to inquire a receiving intention of a recipient, and to operably transmit the available-to-receive notice to the logistics service subsystem (120) only if the recipient device (103) receives an intent-to-receive instruction issued by the recipient.

4. The logistics information management system (100) of claim 1, wherein the recipient device (103) is further arranged to operably generate an inquiry message to inquire a receiving intention of a recipient when the delivery destination information is received by the recipient device (103), and arranged to operably transmit the available-to-receive notice to the logistics service subsystem (120) only if the recipient device (103) receives an intent-to-receive instruction issued by the recipient.

5. The logistics information management system (100) of claim 1, wherein the recipient device (103) is further arranged to operably transmit the cipher key to the logistics service

subsystem (120), and to operably transmit the encrypted recipient position to the block chain subsystem (150);

wherein the block chain subsystem (150) is further arranged to operably store the encrypted recipient position in the order event recorded in the recipient smart contract;

wherein the logistics service subsystem (120) is further arranged to operably read the encrypted recipient position recorded in the order event recorded in the recipient smart contract stored in the block chain subsystem (150);

wherein the logistics service subsystem (120) is further arranged to operably utilize the cipher key to decrypt the encrypted recipient position so as to acquire the second current location of the recipient device (103), and to operably transmit the second current location to the logistician device (105).

6. The logistics information management system (100) of claim 2, further comprising:
 - an e-commerce vender subsystem (110), arranged to operably create the recipient smart contract in the block chain subsystem (150), and to operably write the delivery destination information and the valid vendor identification data into the recipient smart contract so as to form the order event;
 - wherein the e-commerce vender subsystem (110) is arranged to operably generate the delivery destination information according to a delivery location;
 - wherein the recipient device (103) is arranged to operably transmit a recipient account request to the e-commerce vender subsystem (110) so that the e-commerce vender subsystem (110) is enabled to create a recipient account correspondingly;
 - wherein the e-commerce vender subsystem (110) is arranged to operably create a correlation between the recipient account and a recipient smart contract identification data of the recipient smart contract, so that the recipient device (103) accesses the block chain subsystem (150) according to the correlation;
 - wherein the recipient device (103) is further arranged to operably log in to the e-commerce vender subsystem (110) with the recipient account so as to transmit the delivery destination information request to the block chain subsystem (150), and the e-commerce vender subsystem (110) requests the block chain subsystem (150) to provide the delivery destination information corresponding to the delivery destination information request according to the recipient account and the correlation;
 - wherein the block chain subsystem (150) is further arranged to operably provide the delivery destination information to the e-commerce vender subsystem (110) if the first current

vendor identification data matches the valid vendor identification data, and the e-commerce vender subsystem (110) is arranged to operably transmit the delivery destination information to the recipient device (103) according to the correlation.

7. The logistics information management system (100) of claim 6, wherein the e-commerce vender subsystem (110) is further arranged to operably conduct a location de-identification process on the delivery location so as to generate the delivery destination information.

8. A computer program product (166), enabling a recipient device (103) of a logistics information management system (100) to perform a recipient privacy protection operation, wherein the logistics information management system (100) comprises a block chain subsystem (150), a logistics service subsystem (120), and the recipient device (103), the recipient privacy protection operation comprising:

receiving a take-over request generated by the logistics service subsystem (120) when a logistician device (105) approaches a target region, wherein the take-over request comprises a first current vendor identification data and an order event identification data; generating a delivery destination information request comprising the order event identification data and the first current vendor identification data according to the take-over request;

receiving a delivery destination information; and

generating and transmitting an available-to-receive notice to the logistics service subsystem (120) after receiving the delivery destination information;

wherein the block chain subsystem (150) is arranged to operably receive the delivery destination information request, and to operably search for an order event recorded in a recipient smart contract stored in the block chain subsystem (150) according to the order event identification data, and the order event comprises a valid vendor identification data;

wherein the block chain subsystem (150) provides the delivery destination information only if the first current vendor identification data matches the valid vendor identification data;

wherein the logistics service subsystem (120) is further arranged to operably generate a position information request comprising a second current vendor identification data and the order event identification data when the logistician device (105) approaches a delivery destination indicated in the delivery destination information;

wherein the recipient privacy protection operation further comprises:

receiving the position information request;
generating and transmitting a logistics vendor identity authentication request comprising the second current vendor identification data and the order event identification data to the block chain subsystem (150) according to the position information request;
receiving an identity authentication successful notice transmitted from the block chain subsystem (150);
acquiring a second current location of the recipient device (103) after receiving the identity authentication successful notice; and
utilizing a cipher key to encrypt the second current location of the recipient device (103) to generate an encrypted recipient position;
wherein the block chain subsystem (150) is arranged to operably receive the logistics vendor identity authentication request, to operably search for the order event recorded in the recipient smart contract stored in the block chain subsystem (150) according to the order event identification data in the logistics vendor identity authentication request, and to operably read the valid vendor identification data from the order event;
wherein the block chain subsystem (150) provides the identity authentication successful notice only if the second current vendor identification data matches the valid vendor identification data.

9. The computer program product (166) of claim 8, wherein the recipient privacy protection operation further comprises:

determining whether a first current location where the recipient device (103) receives the delivery destination information is within the delivery destination, and transmitting the available-to-receive notice to the logistics service subsystem (120) only if the first current location is within the delivery destination.

10. The computer program product (166) of claim 9, wherein the recipient privacy protection operation further comprises:

generating an inquiry message to inquire a receiving intention of a recipient, and transmitting the available-to-receive notice to the logistics service subsystem (120) only if an intent-to-receive instruction issued by the recipient is received.

11. The computer program product (166) of claim 8, wherein the recipient privacy protection operation further comprises:

generating an inquiry message to inquire a receiving intention of a recipient, and transmitting the available-to-receive notice to the logistics service subsystem (120) only if an intent-to-receive instruction issued by the recipient is received.

12. The computer program product (166) of claim 8, wherein the recipient privacy protection operation further comprises:

transmitting the cipher key to the logistics service subsystem (120); and
transmitting the encrypted recipient position to the block chain subsystem (150);
wherein the block chain subsystem (150) is arranged to operably store the encrypted recipient position in the order event recorded in the recipient smart contract;
wherein the logistics service subsystem (120) is arranged to operably read the encrypted recipient position recorded in the order event recorded in the recipient smart contract stored in the block chain subsystem (150);
wherein the logistics service subsystem (120) is arranged to operably utilize the cipher key to decrypt the encrypted recipient position so as to acquire the second current location of the recipient device (103), and to operably transmit the second current location to the logistician device (105).

13. The computer program product (166) of claim 9, wherein the logistics information management system (100) further comprises an e-commerce vender subsystem (110), arranged to operably create the recipient smart contract in the block chain subsystem (150), and to operably write the delivery destination information and the valid vendor identification data into the recipient smart contract so as to form the order event;

wherein the recipient privacy protection operation further comprises:
transmitting a recipient account request to the e-commerce vender subsystem (110) so that the e-commerce vender subsystem (110) is enabled to create a recipient account correspondingly; and
logging into the e-commerce vender subsystem (110) with the recipient account so as to transmit the delivery destination information to the block chain subsystem (150);
wherein the e-commerce vender subsystem (110) is arranged to operably create the recipient account according to the recipient account request, and to operably create a correlation between the recipient account and a recipient smart contract identification data of the recipient smart contract, so that the recipient device (103) accesses the block chain subsystem (150) according to the correlation;

wherein the e-commerce vender subsystem (110) is arranged to operably request the block chain subsystem (150) to provide the delivery destination information corresponding to the delivery destination information request according to the recipient account and the correlation;

wherein the block chain subsystem (150) is arranged to operably provide the delivery destination information to the e-commerce vender subsystem (110) if the first current vendor identification data matches the valid vendor identification data, and the e-commerce vender subsystem (110) is arranged to operably transmit the delivery destination information to the recipient device (103) according to the correlation.