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(54) Title: SHIPPING MANAGEMENT SYSTEM WITH MULTI-CARRIER SUPPORT

(57) Abstract: Systems, methods, and products for dynamically selecting carriers in a shipping management system are disclosed. In one embodiment, in response to a user requesting a new shipment, a shipping management system collects shipping information from a plurality of carriers. The system provides the user with a choice of carriers to ship the new shipment based on selection rules. In response to the choice of carriers provided to the user, the user can select one of the carriers to execute the new shipment. The shipping management system can send a signal to the computer system of the chosen carrier to execute the new shipment.

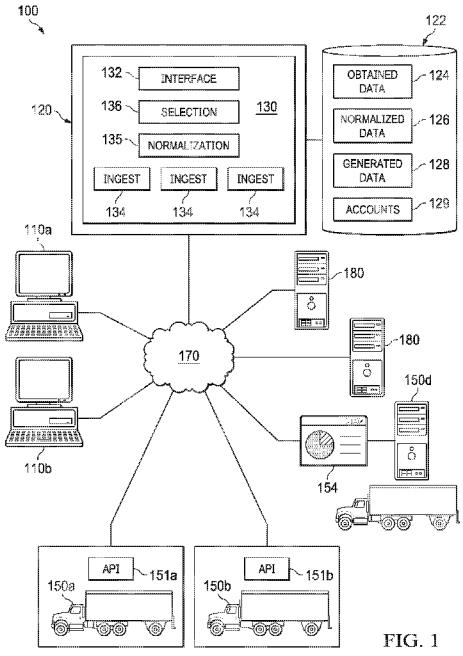

FIG. 1

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SHIPPING MANAGEMENT SYSTEM WITH MULTI-CARRIER SUPPORT

RELATED APPLICATIONS

[0001] This application claims a benefit of priority under 35 U.S.C. § 119 to United States Provisional Patent Application No. 62/432,517 filed December 9, 2016, entitled “SHIPPING MANAGEMENT SYSTEM WITH MULTI-CARRIER SUPPORT”, which is hereby fully incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates generally to computer systems for managing shipment of goods. More particularly the present disclosure relates to online computer systems for dynamic carrier selection.

BACKGROUND

[0003] The shipment of goods between shippers and recipients is typically carried out by carriers that own assets (trucks, cars, cargo ships, airplanes, rail cars) and that are contracted by manufacturers and retailers of those goods. In general, shipments are divided into two modes: “parcel” and “freight.” Parcels are generally small, individual shipments handled by common carriers. Individual shippers can drop off these shipments at numerous locations (or have the shipments picked up) at their convenience. Pricing is generally determined by dimensional and/or weight. Carriers typically limit parcel shipments to particular weight and/or dimensions (e.g., 150 lbs. and 165" in length plus girth).

[0004] A shipment that exceeds the parcel limits is typically categorized as freight. Freight may be further divided into freight modes such as Full Truckload (FTL), Partial Truckload, Less Than Truckload (LTL), Air Freight, Ocean Freight, Rail Freight and Intermodal Freight. Freight pricing is determined on a number of factors including mode, route distance, fuel costs, density and value (weight, length, height), stow-ability, handling, liability, freight class, etc. Freight shipments are generally arranged with a carrier. Arrangements may include how the freight is to be loaded, how long it will take in transport, specialized equipment required or other information to facilitate the delivery.

[0005] Conventionally, shippers maintain internal lists of the costs of shipping goods to various

destinations by each carrier/mode that the shipper uses. When a package is ready to be shipped, the shipper simply selects the lowest cost carrier/mode for that shipment.

[0006] An organization that does a large amount of shipping may have a computer system that is tightly integrated with a carrier system to notify the carrier that a shipment is ready for pickup, print shipping labels, etc. However, conventional shipper systems, even if they can integrate with multiple carriers, are limited because they rely on users to input costs and then base carrier selection on those costs.

[0007] Moreover, prior systems do not adequately account for drop shippers. With drop shipping, a retailer does not keep goods in stock but instead relies on a manufacturer, another retailer, or a wholesaler to ship a product. When a drop shipper is used, the retailer's ordering system will transfer customer orders and shipment details to the drop shipper, ceding control of the shipment provisioning process to the drop shipper. The retailer's shipping system cannot effectively enforce the use of particular carriers or policies on the drop shipper.

SUMMARY OF THE DISCLOSURE

[0008] This disclosure is directed to systems, methods, and products for dynamically selecting carriers in a shipping management system. One particular embodiment is directed to a system for facilitating dynamic carrier selection having one or more computer systems coupled to a network and a data storage device. The system collects shipping information from a plurality of carriers using one or more ingest modules, in response to a user scheduling a new shipment. The system uses one or more normalization modules to normalize the collected shipping information from the plurality of carriers. The system applies one or more selection rules to the normalized collected shipping information to select a group from the plurality of carriers for presentation to the user. One of the selected carriers is chosen by the user or automatically by the system for execution of the new shipment. The system sends a signal to the computer system of the selected carrier to execute the shipment.

[0009] Numerous other embodiments are also possible.

[0010] These, and other, aspects of the disclosure will be better appreciated and understood when considered in conjunction with the following description and the accompanying drawings. It should be understood, however, that the following description, while indicating various embodiments of the disclosure and numerous specific details thereof, is given by way of

illustration and not of limitation. Many substitutions, modifications, additions and/or rearrangements may be made within the scope of the disclosure without departing from the spirit thereof, and the disclosure includes all such substitutions, modifications, additions and/or rearrangements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The drawings accompanying and forming part of this specification are included to depict certain aspects of the disclosure. It should be noted that the features illustrated in the drawings are not necessarily drawn to scale. A more complete understanding of the disclosure and the advantages thereof may be acquired by referring to the following description, taken in conjunction with the accompanying drawings in which like reference numbers indicate like features and wherein:

[0012] FIG. 1 depicts one embodiment of a topology which may be used with a shipping management system.

[0013] FIG. 2 depicts a diagrammatic representation of one embodiment of a scorecard illustrating various metrics for carriers/modes.

[0014] FIG. 3 depicts a dashboard provided by a shipping management system.

[0015] FIG. 4 depicts a schedule pickup menu for a dashboard provided by a shipping management system.

[0016] FIG. 5 depicts a dynamically generated web page in which carriers are presented to the user.

[0017] FIG. 6 depicts a web page in which the user can review the shipping order and finalize the order for shipment by the carrier that was user or automatically selected.

[0018] FIG. 7 depicts a shipping status view provided by a shipping management system.

[0019] FIG. 8 depicts a shipping details view provided by a shipping management system.

DETAILED DESCRIPTION

[0020] The invention and the various features and advantageous details thereof are explained more fully with reference to the nonlimiting embodiments that are illustrated in the accompanying drawings and detailed in the following description. Descriptions of well-known starting

materials, processing techniques, components and equipment are omitted so as not to unnecessarily obscure the invention in detail. It should be understood, however, that the detailed description and the specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only and not by way of limitation. Various substitutions, modifications, additions and/or rearrangements within the spirit and/or scope of the underlying inventive concept will become apparent to those skilled in the art from this disclosure.

[0021] Embodiments described herein provide a shipping management system that integrates with a variety of carrier systems, analyzes carrier tracking data and other data and allows selection of carriers on an individual shipment basis based on dynamic factors. The shipping management system can facilitate shipping across shippers for an account holder and enforce carrier selection policies for the account holder.

[0022] Embodiments of the systems and methods of the present invention may be better explained with reference to FIG. 1 which depicts one embodiment of a topology 100 which may be used to implement embodiments of the systems and methods of the present invention. Topology 100 comprises a set of entities including a shipping management system 120 that is coupled through network 170 to computing devices 110 (e.g. desktop computers, laptop computers, servers, smart phones), and one or more computer systems 150 ("carrier systems") at multiple carriers. Carriers may include national, international and regional carriers (e.g., UPS FREIGHT, SAIA, R+L CARRIERS, ABF, FED EX, DHL). Shipping management system 120 may also connect to various other external systems 180, such as e-commerce servers, ERP systems, TMS systems, ESP/SMS systems, CSR/CRM systems. Network 170 may be for example, a wireless or wireline communication network such as the Internet or wide area network (WAN), publicly switched telephone network (PTSN) or any other type of electronic communication link.

[0023] Shipping management system 120 may comprise one or more computer systems with central processing units executing instructions embodied on one or more computer readable media where the instructions are configured to perform at least some of the functionality associated with embodiments of the present invention. These applications may include a shipping management application 130 comprising one or more applications (instructions embodied on a computer readable media) configured to implement an interface module 132, data ingest modules 134, a normalization module 135, selection module 136 utilized by the shipping management system 120.

[0024] Furthermore, shipping management system 120 may include data store 122 operable to

store obtained data 124, normalized data 126, generated data 128, account information 129 and other data. Account information 129 includes information on account holders of accounts with shipping management system 120. The account information may be associated with individuals, shippers or entities, such as retailers, that use drop shippers, where the drop shippers may or may not be account holders. The account holder information 129 may include credentials for one or more carrier systems 150 so that shipping management system 120 may log into a carrier system 150 on behalf of the account holder to schedule a shipment, request tracking information, etc.

[0025] Shipping management system 120 may provide a wide degree of functionality including utilizing one or more interfaces 132 configured to for example, to receive and respond to queries from users at computing devices 110. It will be understood that the particular interface 132 utilized in a given context may depend on the functionality being implemented by shipping management system 120, the type of network 170 utilized to communicate with any particular entity, the type of data to be obtained or presented, the time interval at which data is obtained from the entities, the types of systems utilized at the various entities, etc. In some embodiments, these interfaces may include, for example web pages, web services or application programming interfaces (APIs). In particular, in some embodiments, shipping management system 120 can provide an API so that online ordering systems may be integrated with shipping management system 120. Shipping management system 120 may select a carrier and schedule pick up of a shipment as part of a customer checkout process on an online ordering system.

[0026] Shipping management system 120 can interact with carrier systems 150 to execute shipments, collect tracking information, or take other actions. According to one embodiment, shipping management system 120 may provide an interface 132 through which a user can define a shipment. The shipment information may include an account holder if different than the shipper (*e.g.*, a drop shipper can indicate (or it may be implicit) that the shipment is on behalf of a particular retailer), recipient, from address (shipper), to address (consignee), weight, product class and dimensions and other information. Shipping management system 120 can apply defined rules to multiple real time and historical signals to decision carrier selection. Shipping management system 120 may provide carrier selections to the user so that the user may select a final shipper or shipping management system 120 may automatically select the carrier. Shipping management system may then interact with the carrier system 150 for the selected carrier to execute the shipment.

[0027] In one embodiment, shipping management system applies rules to a combination of:

- transportation signals, such as cost for a specific item (specific weight, origin, destination), current conditions;
- historical signals such as carrier performance, both overall and area-specific;
- business signals such as desired carrier mix or spend threshold. Business signals may include recipient value signals such as lifetime value or a specific purchase value.

[0028] In support of carrier selection, transportation signal data is collected as part of creating shipments. A transportation signal typically includes parameters necessary to order shipping, including information such as the shipment origin and destination, items (dimensions, weight and quantity). Other transportation signal data may include shipment preferences entered by the user. For example, the user may indicate that the shipping management system 120 should prioritize transit time, historical on-time delivery or other selection criteria when selecting a carrier. The transportation signals may further include a rate quote from the carrier specific to the shipment.

[0029] The transportation signal data from client computers 110 is collected by the interface module 132, can transmit that information to the further system through a normalized API. Ingest modules 134 can collect transportation signal data from the carriers. The transportation signal data may be stored in data 122 and may be normalized.

[0030] When a user defines a shipment, shipping management system 120 creates and sends a “shipment data packet” in real time to carrier candidates. The shipment data packet may include parameters such as from address (shipper), to address (consignee), dimensions, weight and quantity, mode, product class or other information used by the carrier to provide a cost to ship and estimated transit time.

[0031] In some cases, carrier systems 150 may provide public APIs 151 that allow external systems to execute shipments and access tracking data. An ingest module can be configured to interact with APIs 151 to submit the shipment data packet to various carriers and store the responses.

[0032] Other carrier systems 150 may only provide a web page interface, such as web page interface 154, for requesting and tracking shipments. However, since the structure of web pages can be understood through observation, an ingest module 134 may be programmed to submit information through a web page and collect the returned data.

[0033] Normalization module 135 can normalize the cost, estimated transit time and other data

returned by carrier systems 150.

[0034] During shipment, carrier systems 150 may provide shipment tracking data that indicates when a shipment was ready for pickup, when the shipment was picked up, check in/check out at various tracking locations, when the shipment was actually delivered. Each tracking update can contain one or more of status (status code or other description), location and time information for a shipment. In some cases, a tracking data may indicate an exception. Exceptions are events that delay or otherwise adversely affect a shipment. Exception data may include for example, data that may indicate that a pickup was missed, a shipment was delivered late, a shipment was damaged, etc.

[0035] Shipment tracking data (and other data) can be normalized. In one embodiment, shipping management system 120 defines a status mapping document (e.g., in JavaScript Object Notation (JSON) format or other format) which defines:

- An input status code and/or status description.
- A matching rule, which is either “matches exactly”, “starts with” or “ends with”, that is applied to the input status code or status description. In some embodiments, applying matching rules may include parsing carrier provided transit data for specific codes or descriptive words (e.g., “arrived”).
- A resulting normalized status code, exception flag and exception category for each matching input.

[0036] By defining a carrier-specific status mapping, normalization module 135 allows shipping management system 120 to compensate for differences between carriers using more or less specific rules based on the granularity for the source data.

[0037] Ingest modules 134 can collect tracking data from carrier systems 150 and normalization module 135 can normalize the data from the various carriers.

[0038] The historical signal data, including historical transportation signal data, historical shipment tracking data and other historical data can be persistently stored in data store 122. The historical signal data can include data on all executed and ingested shipments, as well as all tracking updates which pertain to each shipment. The historical signal data may be fully normalized.

[0039] Historical data for shipments may also be augmented by users. For example, even if a carrier-provided data does not indicate that a shipment was damaged, the user associated with the shipment may provide such information through an interface.

[0040] Shipping management system 120 can thus collect data on actual transit times by carrier and mode from origin (address or postal code) to destination (address or postal code) for shipments of various sizes, weights, etc. along with the estimated transit times for the prior shipments, exceptions that occurred and other information about shipments.

[0041] Selection module 136 may process historical signal data to generate one or more metrics for a carrier/mode. Examples include, but are not limited to, average transit time (ATT) from an origin to destination, on time percentage (OTP), delivery before exception percentage (DBE) (deliveries that were delivered without an exception prior to achieving a "delivered" status), average length of haul (LOH), average cost per pound per mile (cost/lb/mi), number of in transit shipments. DBE may account for all types of exceptions or only certain types of exceptions and there may be different DBEs for different types of exceptions (e.g., damage exception vs. delay exception).

[0042] One or more of the historical metrics may account for source/destination, time of year, package size class, package weight class or other factors. In some cases, some historical shipping metrics may be calculated based on all past shipments or all shipments in a time window, while other historical shipping metrics account for source/destination, time of year, package size class, package weight class or other factors. For example, in one embodiment, OTP may be calculated in aggregate for a carrier/mode, while average transit time is determined on a per origin/destination pair basis.

[0043] FIG. 2 is a diagrammatic representation of one embodiment of a scorecard illustrating various metrics for carriers/modes. In the example of FIG. 2, five carriers are shown (Carrier 1, Carrier 2, Carrier 3, Carrier 4, and Carrier 5,). For each carrier, the scorecard shows mode, OTP, DBE, LOH, Cost, and number of in transit shipments.

[0044] Returning to FIG. 1, shipping management system 120 may also receive business signals, from a shipper such as desired carrier mix or spend threshold. Business signals may include recipient value signals such as lifetime value or a specific purchase value. Recipient value signals can include information regarding the value of a recipient to an account holder. This information may be provided by the account holder as a classification (*e.g.,* a user may label particular recipients as "Tier 1", "Tier 2" etc.). In other cases, selection module 136 may apply rules to shipping data to determine recipient value. The "Tier 1" recipients of a shipper (or account holder) may be, for example, a recipient that receives *x* number of shipments a month from an account holder, or greater than a particular percentage of an account holder's shipments, or is in the top *y* recipients for the account holder. Customer tier classifications may be updated as new information becomes available or according to a schedule.

[0045] Selection module 136 may score carriers/modes based on one or more factors from historical data, current transportation signal data and business signal data. According to one embodiment, for example, when a user enters shipment information, selection module 136 may apply a scoring algorithm to score carriers/modes based on one or more factors from the historical data, such as ATT for the origin/destination postal codes, OTP, DBE, cost/lb/mi and other factors. The factors may be weighted where the weights are tunable based user (e.g., account holder) preferences. If the shipper indicates that speed and on time delivery are more important for a shipment, the scoring algorithm may weight ATT and OTP more heavily than cost/lb/mi. On the other hand, if cost is a higher priority, a scoring algorithm that weights cost more heavily may be selected.

[0046] In the above example, historical cost/lb/mi is used, and thus a score that accounts for price can be calculated prior to receiving a quote from a carrier for a particular shipment. In another embodiment, shipping management system 120 can send the shipment packet to the carrier systems 150, receive quotes in return and include data from the returned quote, such as price, estimated delivery time, in the shipping algorithm.

[0047] The carriers presented to the shipper for selection can be based on the scoring. For example, when a shipper wishes to select a carrier for a particular shipment, the shipper may be shown the carriers in rank-order based on the scoring. In some embodiments, the shipper's selection of carrier is limited to the top "n" carrier(s) based on the scoring.

[0048] While in the previous examples, selection module 136 was described in terms of using a weighted selection scoring algorithm to score carriers, selection module 136 may use other rules. In one embodiment, minimum criteria for one or more performance metrics may be set by default or by the shipper and the selection module 136 can select from the carriers that meet those criteria based on selection rules. For example, the shipper may specify a minimum OTP of 85%. When the shipper initiates a new shipment, shipping management system 120 can, for example, select the lowest cost carrier from the carriers that have an OTP of 85% or greater. Using the data of FIG. 2, the shipping management system 120 could select the lowest cost carrier between Carrier 3 and Carrier 5 because these are the only carriers with an OTP > 85%.

[0049] According to one embodiment, selection module 136 may take into account recipient value signal data when scoring carriers. For example, in one embodiment, the account holder may specify that on time delivery is most important for Tier 1 recipients, but, for other recipients, cost (historical or quoted) and on time delivery are equally important. In this case, OTP would be weighted most heavily for Tier 1 recipients, whereas OTP and cost could be

weighted equally for non-Tier 1 recipients. As another example, the shipper may specify rules such as:

Tier 1: OTP > 85%, DBE > 75%, selection criteria = ATT;

Tier 2: OTP > 85%, DBE > 50%, selection criteria = cost;

Tier 3: selection criteria = cost.

Again using FIG. 2 and the example rules above: i) for a shipment to a Tier 1 recipient, selection module 136 would select Carrier 3 based on OPT and DBE; ii) for a shipment to a Tier 2 recipient, selection module 136 would select either Carrier 3 or Carrier 5 based on which had the lowest cost for the origin/destination of the shipment (or would present Carrier 3 and Carrier 5 in rank order based on cost for selection by the shipper); and iii) for a shipment to a Tier 3 recipient, the selection module 136 would simply select the lowest cost carrier or rank the carriers based on lowest cost.

[0050] It can be noted that one or more performance metrics, weighted performance metrics, scores (including rankings) used or produced by the scoring rules may be pre-calculated in that they may be current based on the latest shipping data from prior shipments that has been processed (e.g., as that information came in or according to a schedule) but are not calculated in response to a new shipping request. This can make the system more efficient and responsive as the system does not have to calculate the pre-calculated item for every new shipping request at the time that request is being made. In other embodiments, one or more of the metrics, weighted metrics or scores used or produced by the scoring algorithm may be calculated at the time the shipment is requested.

[0051] In operation, shipping management system 120 may provide a system through which shippers can select carriers, schedule pick up of shipments and track shipments. In one embodiment, when an account holder requests a shipment on behalf of itself, shipping management system 120 may provide the account holder with a choice of carriers to ship any particular shipment based on selection rules (*e.g.*, the top three carriers) whereas when another shipper requests a shipment on behalf of an account holder, (*e.g.,* a drop shipper requests a shipment), shipping management system 120 may enforce the account holder's policies and automatically select a carrier for the shipment. In any event, when a carrier is selected by user selection or automatically, shipping management system 120 can

communicate with carrier system 150 through the API 151 to execute the shipment.

[0052] FIG. 3 illustrates an embodiment of a dashboard provided by shipping management system 120 (e.g., a web based dashboard generated by interface module 132) to a user ("John Smith") associated with an account holder ("Company 1"). From the dashboard, the user can view various metrics and access functions of shipping system 120. For example, the user can view shipment exceptions, view tracking information, etc. In particular, the user can schedule a new shipment (by selecting the menu item indicated at 300).

[0053] When a user selects to schedule a new shipment using the system, a new shipment page is displayed (FIG. 4). With respect to FIG. 4, for example, the user provides shipment information to schedule pickup of a new shipment. Note that the shipper may be able to specify the shipper role (e.g., shipper, drop shipper, etc.). Although not shown, the shipper can add additional information such as dimensions, weight or information needed to generate a shipment packet. In response to receiving the shipment information from the shipper and potentially quotes from multiple carriers, shipping management system 120 can provide a list of potential carriers based on the information and selection rules.

[0054] FIG. 5, for example, illustrates a dynamically generated web page in which carriers are presented to the user. In the example of FIG. 5, five carriers are shown, along with several pieces of information. In this example, for each carrier, information is shown relating to liability, transit days, an estimated delivery date, and a net cost. In this example, one of the five carriers (Carrier 5) is shown, but the system is unable to show any information, due to the condition described.

[0055] In one embodiment, the carriers are presented in rank order based on selection module 136 scoring the carriers on historical shipping data, recipient value data or other data as discussed above. The carriers displayed may be the top "n" carriers based on the scoring algorithm, the carriers achieving a designated minimum score or carriers selected based on other criteria. The carrier(s) presented to a drop shipper may be presented based on a scoring algorithm selected by the retailer/manufacturer etc. for which the drop shipper is shipping.

[0056] FIG. 5 also shows a "SELECT" button for four of the carriers. In this example, the shipper can then select a carrier (e.g., by clicking on the "SELECT" link) and schedule a pick up. In another embodiment, the top carrier is automatically selected by selection module 136 based on the scoring algorithm. FIG. 6 illustrates a web page in which the user can review the shipping order and finalize the order for shipment by the carrier that the user selected or

that was automatically selected.

[0057] A user may also be able to access other information through the dashboard. For example, a user may be able to view the status of all shipments associated with that shipper. For example, FIG. 7 is a web page view showing a list of shipments, including a "Status" column, which shows the status of each shipment. In this embodiment, individual shipments are presented with various visual indicators (icons, colors, etc.) to indicate the status of each shipment. The user can select a particular shipment by clicking on the shipment to drill down into the details of the shipment (FIG. 8). In the example of FIG. 8, the user can view information such as the ship date, the origin, the destination, the estimated delivery, carrier exceptions, and the shipping history.

[0058] Embodiments of a hardware architecture for implementing certain embodiments is described herein. One embodiment can include one or more computers communicatively coupled to a network. As is known to those skilled in the art, the computer can include a central processing unit ("CPU"), at least one read-only memory ("ROM"), at least one random access memory ("RAM"), at least one hard drive ("HD"), and one or more input/output ("I/O") device(s). The I/O devices can include a keyboard, monitor, printer, electronic pointing device (such as a mouse, trackball, stylus, etc.), or the like. In various embodiments, the computer has access to at least one database over the network.

[0059] ROM, RAM, and HD are computer memories for storing computer instructions executable (in other which can be directly executed or made executable by, for example, compilation, translation, etc.) by the CPU. Within this disclosure, the term "computer-readable medium" is not limited to ROM, RAM, and HD and can include any type of data storage medium that can be read by a processor. In some embodiments, a computer-readable medium may refer to a data cartridge, a data backup magnetic tape, a floppy diskette, a flash memory drive, an optical data storage drive, a CD-ROM, ROM, RAM, HD, or the like.

[0060] At least portions of the functionalities or processes described herein can be implemented in suitable computer-executable instructions. The computer-executable instructions may be stored as software code components or modules on one or more computer readable media (such as non-volatile memories, volatile memories, DASD arrays, magnetic tapes, floppy diskettes, hard drives, optical storage devices, etc. or any other appropriate computer-readable medium or storage device). In one embodiment, the computer-executable instructions may include lines of compiled C++, Java, HTML, or any other programming or scripting code.

[0061] Additionally, the functions of the disclosed embodiments may be implemented on one computer or shared/distributed among two or more computers in or across a network. Communications between computers implementing embodiments can be accomplished using any electronic, optical, radio frequency signals, or other suitable methods and tools of communication in compliance with known network protocols.

[0062] As used herein, the terms “comprises,” “comprising,” “includes,” “including,” “has,” “having” or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a process, article, or apparatus that comprises a list of elements is not necessarily limited only those elements but may include other elements not expressly listed or inherent to such process, article, or apparatus. Further, unless expressly stated to the contrary, “or” refers to an inclusive or and not to an exclusive or. For example, a condition “A or B” is satisfied by any one of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).

[0063] Additionally, any examples or illustrations given herein are not to be regarded in any way as restrictions on, limits to, or express definitions of, any term or terms with which they are utilized. Instead, these examples or illustrations are to be regarded as being described with respect to one particular embodiment and as illustrative only. Those of ordinary skill in the art will appreciate that any term or terms with which these examples or illustrations are utilized will encompass other embodiments which may or may not be given therewith or elsewhere in the specification and all such embodiments are intended to be included within the scope of that term or terms. Language designating such nonlimiting examples and illustrations includes, but is not limited to: “for example,” “for instance,” “e.g.,” “in one embodiment.”

[0064] Benefits, other advantages, and solutions to problems have been described above with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any component(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential feature or component.

WHAT IS CLAIMED IS:

1. A system for facilitating dynamic carrier selection in a shipping management system comprising:

one or more computer systems;

a data storage device coupled to the one or more computer systems; and

wherein the one or more computer systems is configured to:

responsive to a user scheduling a new shipment using a user interface of a shipping management system, interact with computer systems of a plurality of carriers over a network to collect shipping information from the plurality of carriers by one or more ingest modules of the shipping management system, wherein the shipping information from each of the plurality of carriers has a carrier specific format used by the respective carrier;

normalize, by one or more normalization modules, the collected shipping information from the plurality of carriers;

determine one or more metrics for the plurality of carriers based on historical signal data;

select, by a selection module, one or more of the plurality of carriers based on an application of one or more selection rules to the normalized collected shipping information from and the one or more metrics for the plurality of carriers;

present, using the user interface, the selected one or more of the plurality of carriers to the user; and

executing, by the shipping management system, the new shipment based on a carrier chosen among the selected carriers, wherein executing the new shipment comprises sending a signal to a computer system of the chosen carrier to execute the new shipment.

2. The system of claim 1, wherein the carrier is chosen by the user.

3. The system of claim 1, wherein the carrier is automatically chosen by the shipping management system.

4. The system of claim 3, wherein the carrier is automatically chosen by the shipping management system based on an estimated cost of the new shipment and at least one additional factor.

5. The system of claim 1, wherein the selection module applies a scoring algorithm to score the plurality of carriers based on a plurality of factors relating to the collected shipping information.

6. The system of claim 5, wherein the plurality of factors includes cost.

7. The system of claim 5, wherein the plurality of factors includes reliability.

8. A method of dynamically carrier selection in a shipping management system comprising:

responsive to a user scheduling a new shipment using a user interface of a shipping management system, interacting with computer systems of a plurality of carriers over a network to collect shipping information from a plurality of carriers by one or more ingest modules of the shipping management system, wherein the shipping information from each of the plurality of carriers has a carrier specific format used by the respective carrier;

normalize, by one or more normalization modules, the collected shipping information from the plurality of carriers;

determine one or more metrics for the plurality of shippers based on historical signal data;

select, by a selection module, one or more of the plurality of carriers based on an application of one or more selection rules to the normalized collected shipping information from and one or metrics for the plurality of carriers;

present, using the user interface, the selected one or more of the plurality of carriers to the user; and

executing, by the shipping management system, the new shipment based on a carrier chosen among the selected carriers, wherein executing the new shipment comprises sending a signal to a computer system of the chosen carrier to execute the new shipment.

9. The method of claim 8, wherein the carrier is chosen by the user.

10. The method of claim 8, wherein the carrier is automatically chosen by the shipping management system.

11. The method of claim 10, wherein the carrier is automatically chosen by the shipping management system based on an estimated cost of the new shipment and at least one additional factor.

12. The method of claim 8, wherein the selection module applies a scoring algorithm to score the plurality of carriers based on a plurality of factors relating to the collected shipping information.

13. The method of claim 12, wherein the one or more factors includes cost and at least one additional factor.

14. The method of claim 12, wherein the one or more factors includes reliability.

15. A computer program product comprising a non-transitory computer readable medium storing a set of computer executable instructions, the computer executable instructions executable to perform a method comprising:

responsive to a user scheduling a new shipment using a user interface of a shipping management system, interacting with computer systems of a plurality of carriers over a network to collect shipping information from a plurality of carriers by one or more ingest modules of the shipping management system, wherein the shipping information from each of the plurality of carriers has a carrier specific format used by the respective carrier;

normalizing, by one or more normalization modules, the collected shipping information from the plurality of carriers;

determining one or more metrics for the plurality of shippers based on historical signal data;

selecting, by a selection module, one or more of the plurality of carriers based on an application of one or more selection rules to the normalized collected shipping information from and one or metrics for the plurality of carriers;

presenting, using the user interface, the selected one or more of the plurality of carriers to the user; and

executing, by the shipping management system, the new shipment based on a carrier chosen among the selected carriers, wherein executing the new shipment comprises sending a signal to a computer system of the chosen carrier to execute the new shipment.

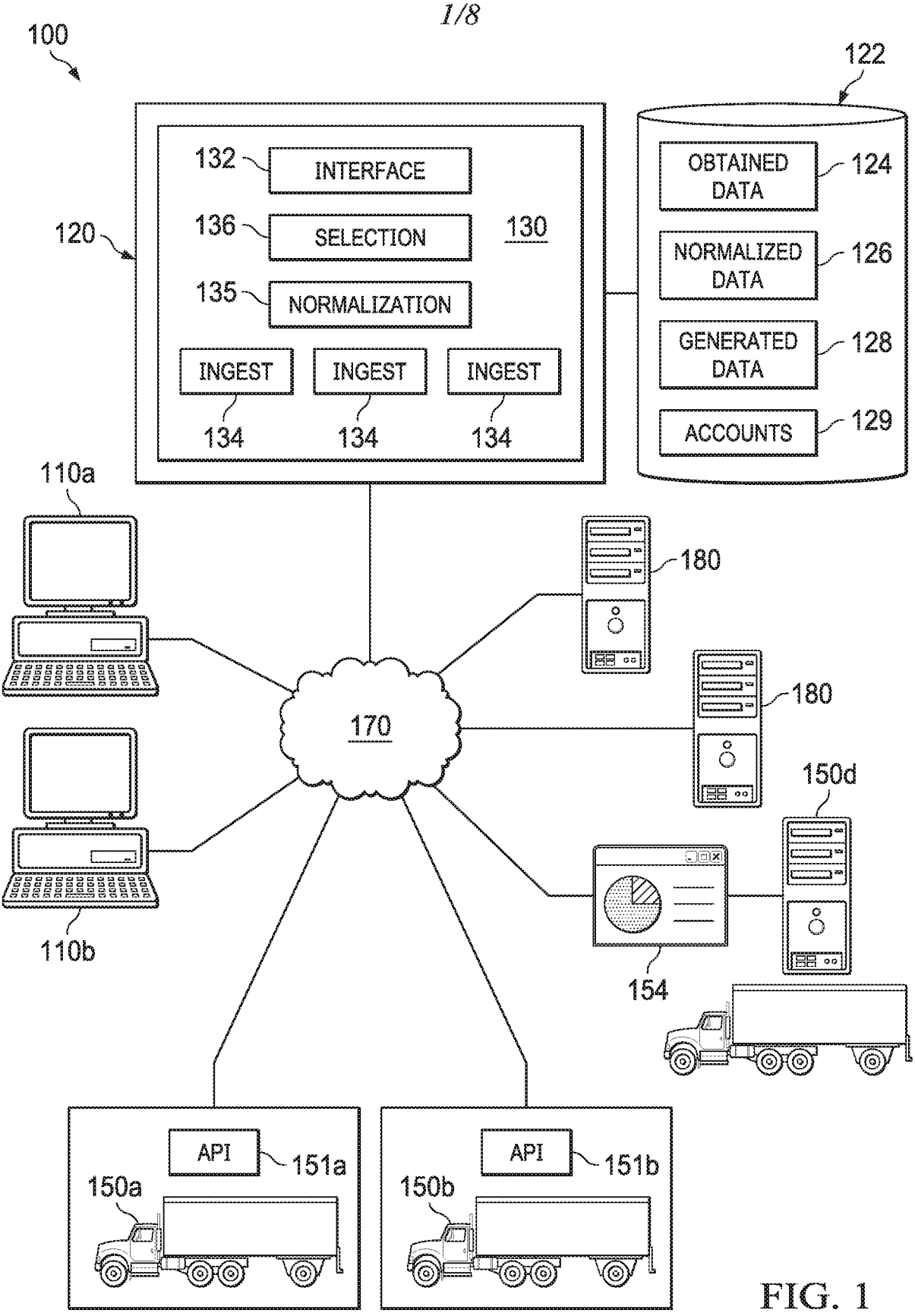
16. The computer program product of claim 15, wherein the carrier is chosen by the user.

17. The computer program product of claim 15, wherein the carrier is automatically chosen by the shipping management system.

18. The computer program product of claim 17, wherein the carrier is automatically chosen by the shipping management system based on an estimated cost of the new shipment and at least one additional factor.

19. The computer program product of claim 15, wherein the selection module applies a scoring algorithm to score the plurality of carriers based on a plurality of factors related to the collected shipping information.

20. The computer program product of claim 19, wherein the plurality of factors includes cost and at least one additional factor.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SELECTION
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NORMALIZATION
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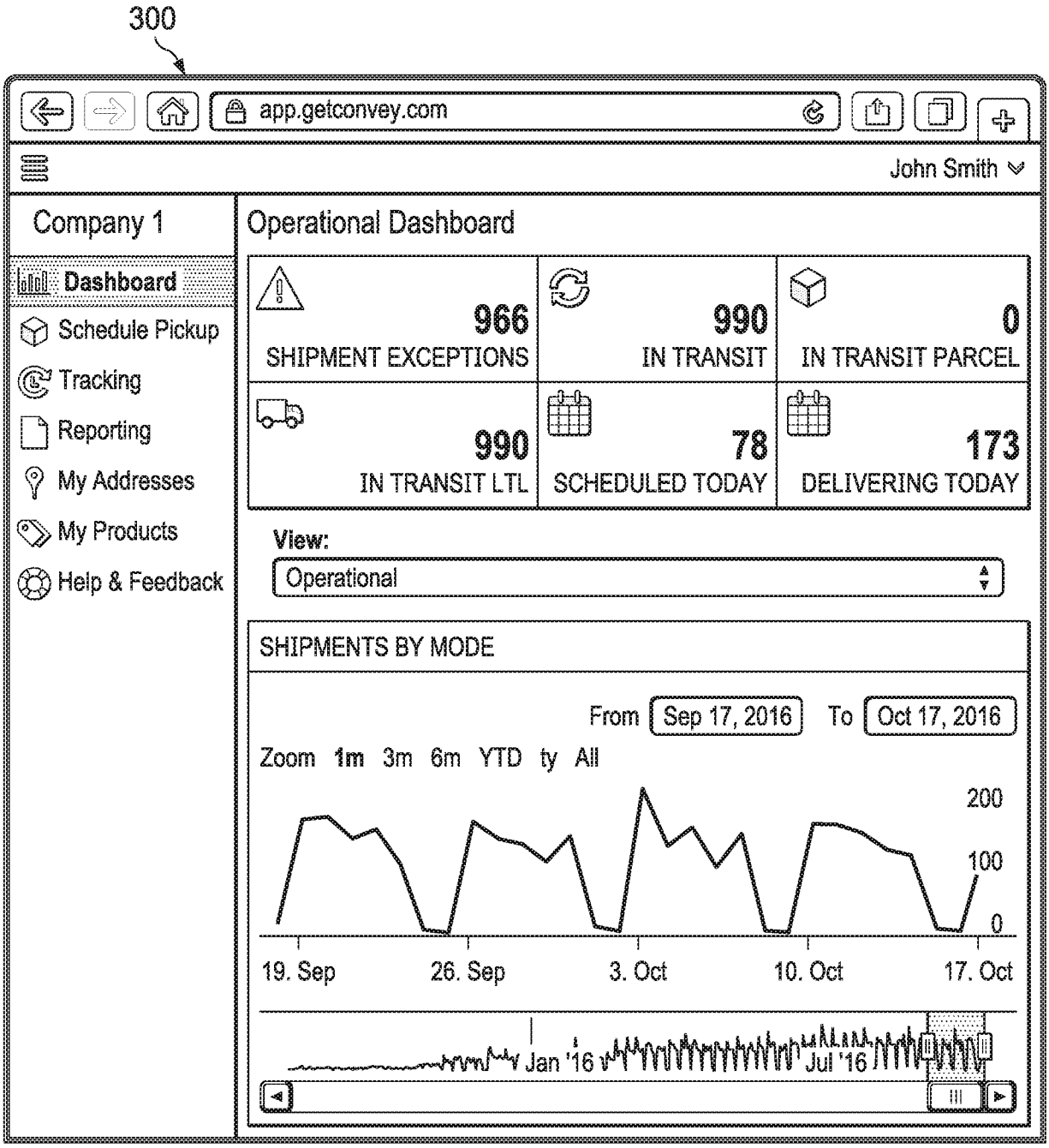
NORMALIZED DATA
126
GENERATED DATA
128
ACCOUNTS
129
110a
180
180
170
150d
110b
154
API
151a
150a
API
151b
150b

FIG. 1

CARRIER PERFORMANCE

Carrier	Mode	OTP	DBE	LOH(mi)	Cost/lb/mi	In Transit
Carrier 1	LTL	83.6%	49%	1423	$2.02	485
Carrier 2	LTL	80.5%	67%	1414	$2.39	335
Carrier 3	LTL	85.5%	75%	464	$2.82	271
Carrier 4	LTL	73.7%	69%	1637	$2.46	228
Carrier 5	LTL	89.6%	60%	141	$0.62	3

FIG. 2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app.getconvey.com
John Smith
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Schedule Pickup
Tracking
Reporting
My Addresses
My Products
Help & Feedback
Operational Dashboard
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SHIPMENT EXCEPTIONS
990
IN TRANSIT
0
IN TRANSIT PARCEL
990
IN TRANSIT LTL
78
SCHEDULED TODAY
173
DELIVERING TODAY
View:
Operational
SHIPMENTS BY MODE
From Sep 17, 2016 To Oct 17, 2016
Zoom 1m 3m 6m YTD ty All
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100
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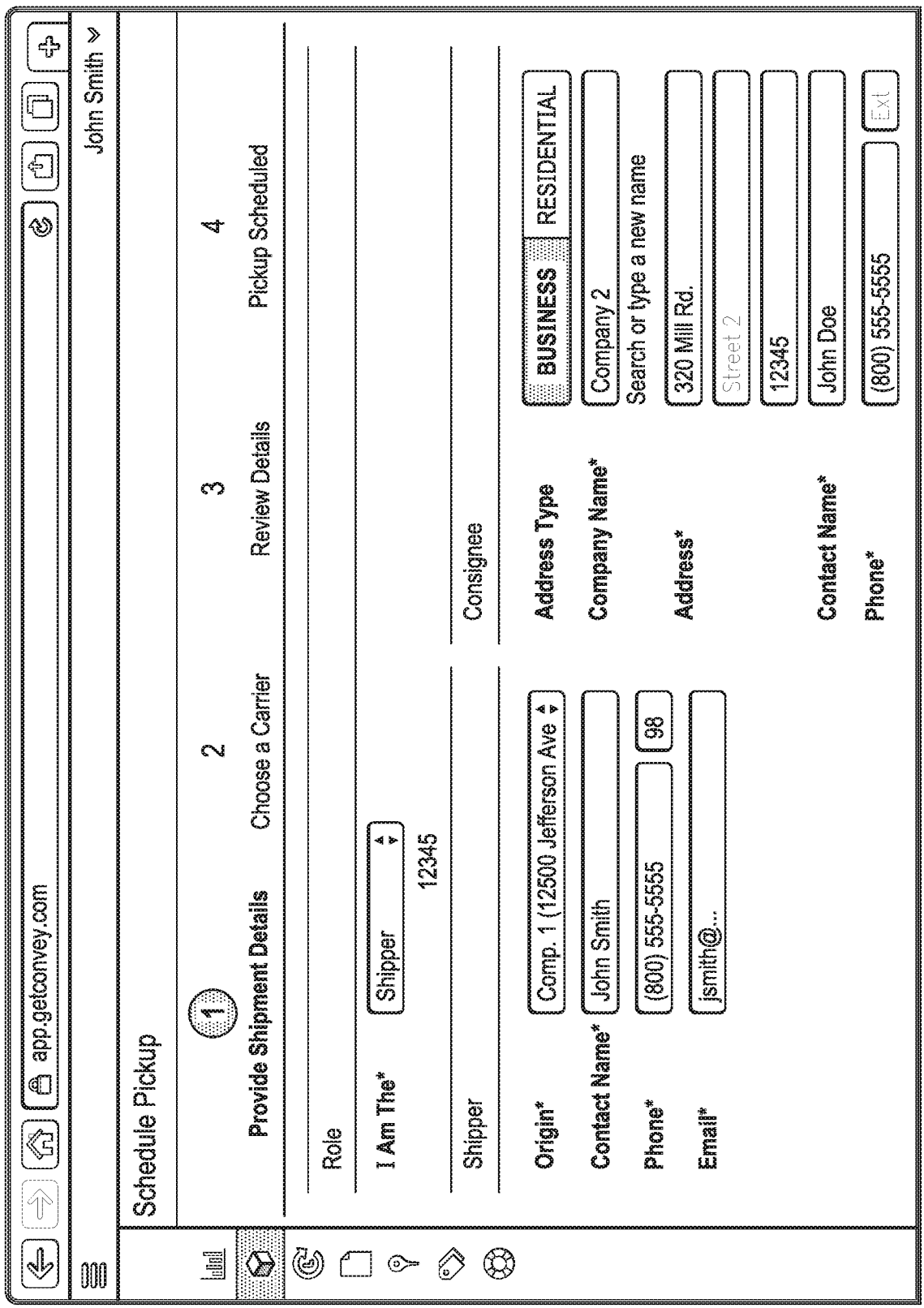
19. Sep
26. Sep
3. Oct
10. Oct
17. Oct
Jan '16
Jul '16

FIG. 3


app.getconvey.com
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Schedule Pickup
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Provide Shipment Details
2
Choose a Carrier
3
Review Details
4
Pickup Scheduled
Role
I Am The*
Shipper
12345
Shipper
Consignee
Origin*
Comp. 1 (12500 Jefferson Ave
Contact Name*
John Smith
Phone*
(800) 555-5555
98
Email*
jsmith@...
Address Type
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RESIDENTIAL
Company Name*
Company 2
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Address*
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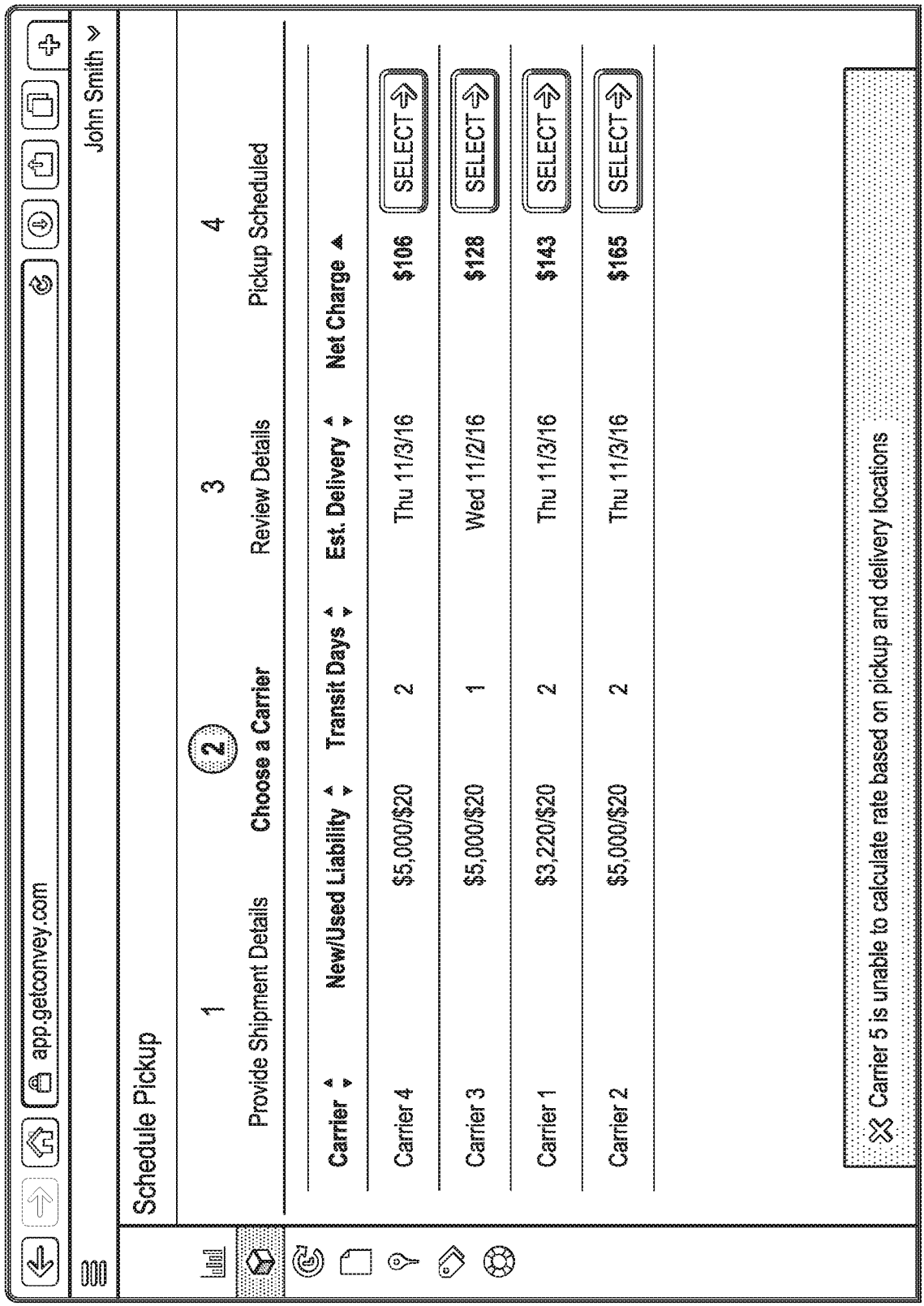
Street 2
12345
Contact Name*
John Doe
Phone*
(800) 555-5555
Ext

FIG. 4


app.getconvey.com
John Smith
Schedule Pickup
1
Provide Shipment Details
2
Choose a Carrier
3
Review Details
4
Pickup Scheduled
Carrier
New/Used Liability
Transit Days
Est. Delivery
Net Charge
Carrier 4
$5,000/$20
2
Thu 11/3/16
$106
SELECT
Carrier 3
$5,000/$20
1
Wed 11/2/16
$128
SELECT
Carrier 1
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2
Thu 11/3/16
$143
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Carrier 2
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2
Thu 11/3/16
$165
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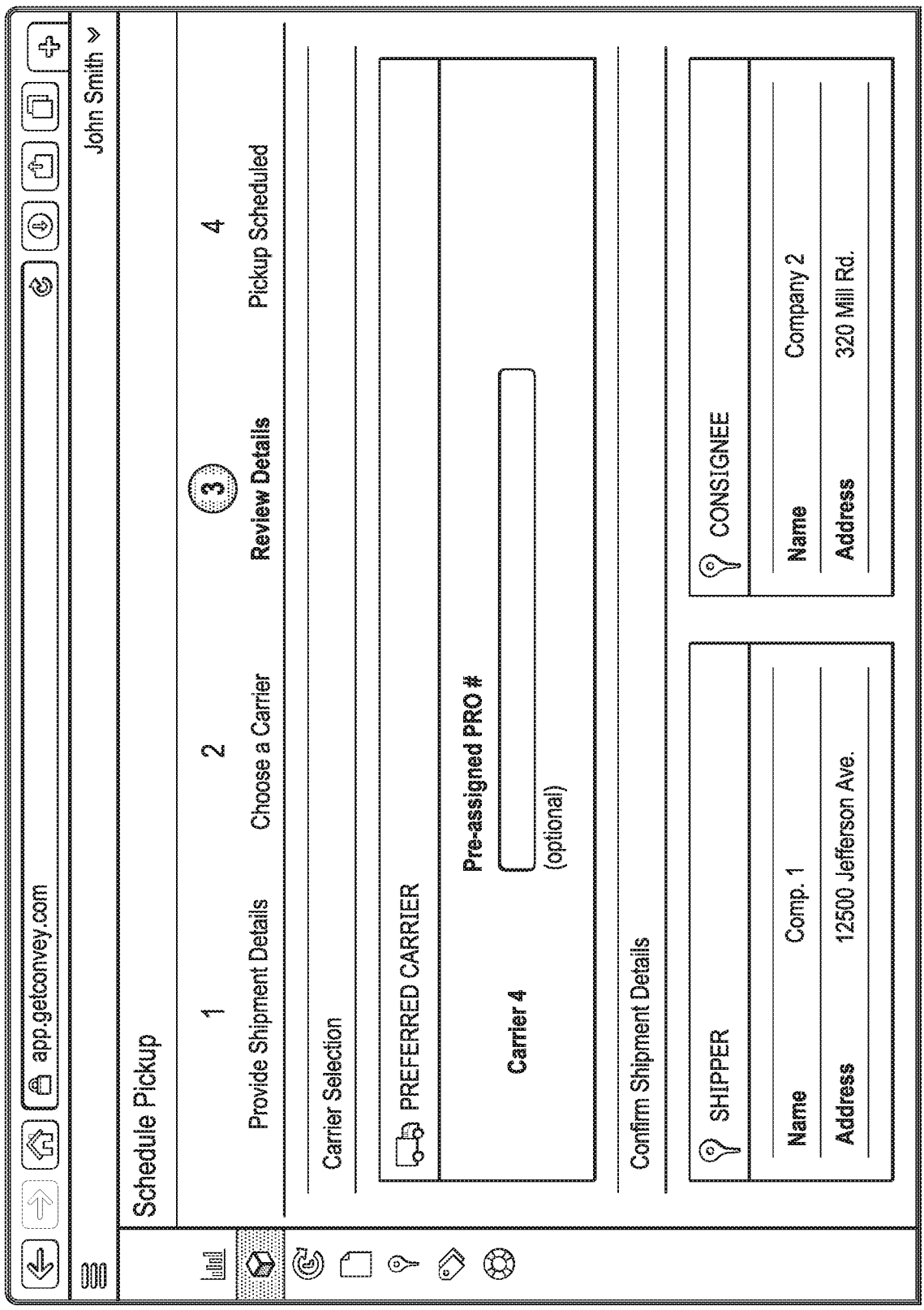
FIG. 5


app.getconvey.com
John Smith
Schedule Pickup
1
Provide Shipment Details
2
Choose a Carrier
3
Review Details
4
Pickup Scheduled
Carrier Selection
PREFERRED CARRIER
Carrier 4
Pre-assigned PRO #
(optional)
Confirm Shipment Details
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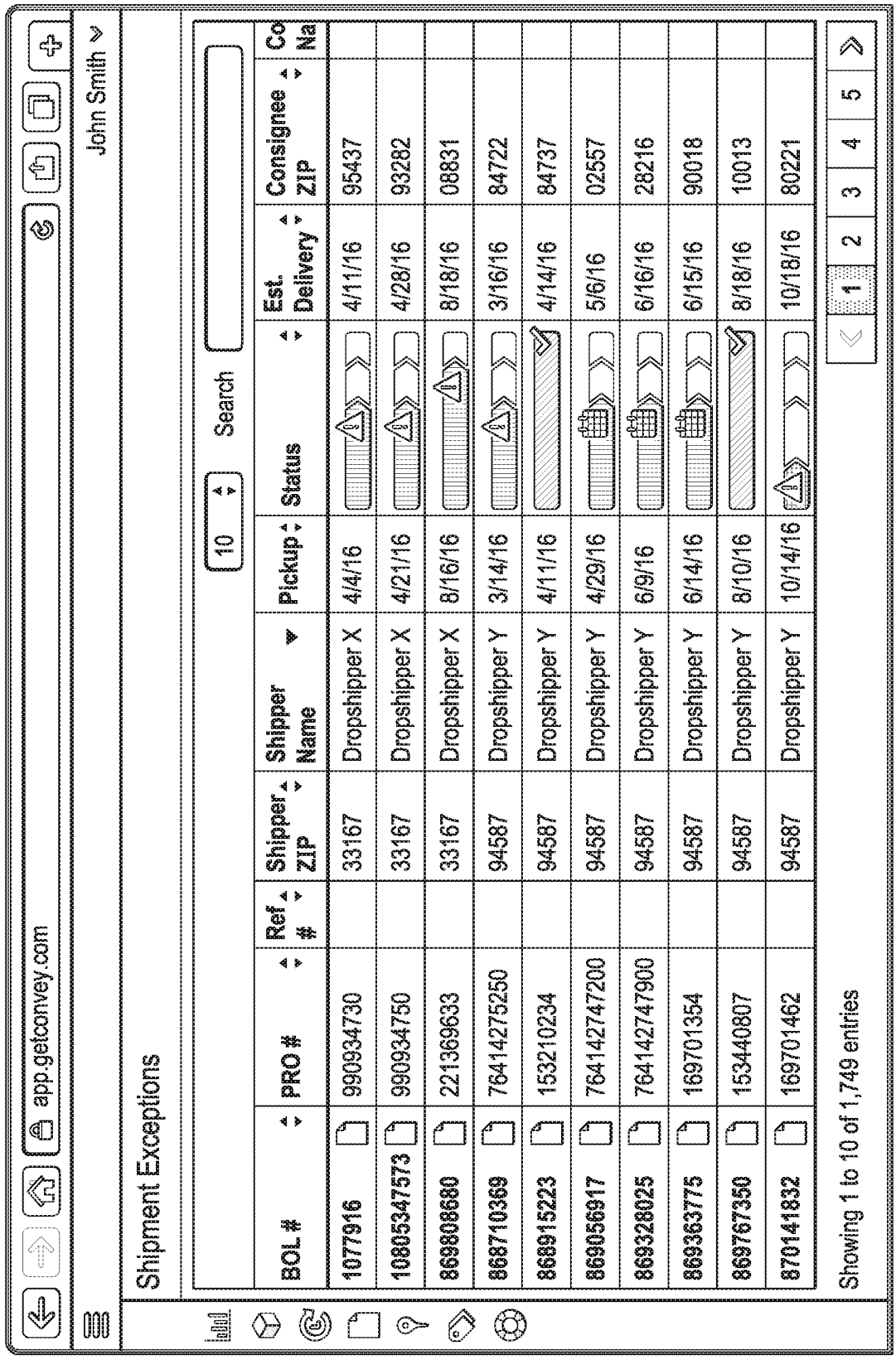
Comp. 1
Address
12500 Jefferson Ave.
CONSIGNEE
Name
Company 2
Address
320 Mill Rd.

FIG. 6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John Smith
Shipment Exceptions
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PRO #
Ref #
Shipper ZIP
Shipper Name
Pickup
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Est. Delivery
Consignee ZIP
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10805347573 990934750 33167 Dropshipper X 4/21/16 4/28/16 93282
869808680 221369633 33167 Dropshipper X 8/16/16 8/18/16 08831
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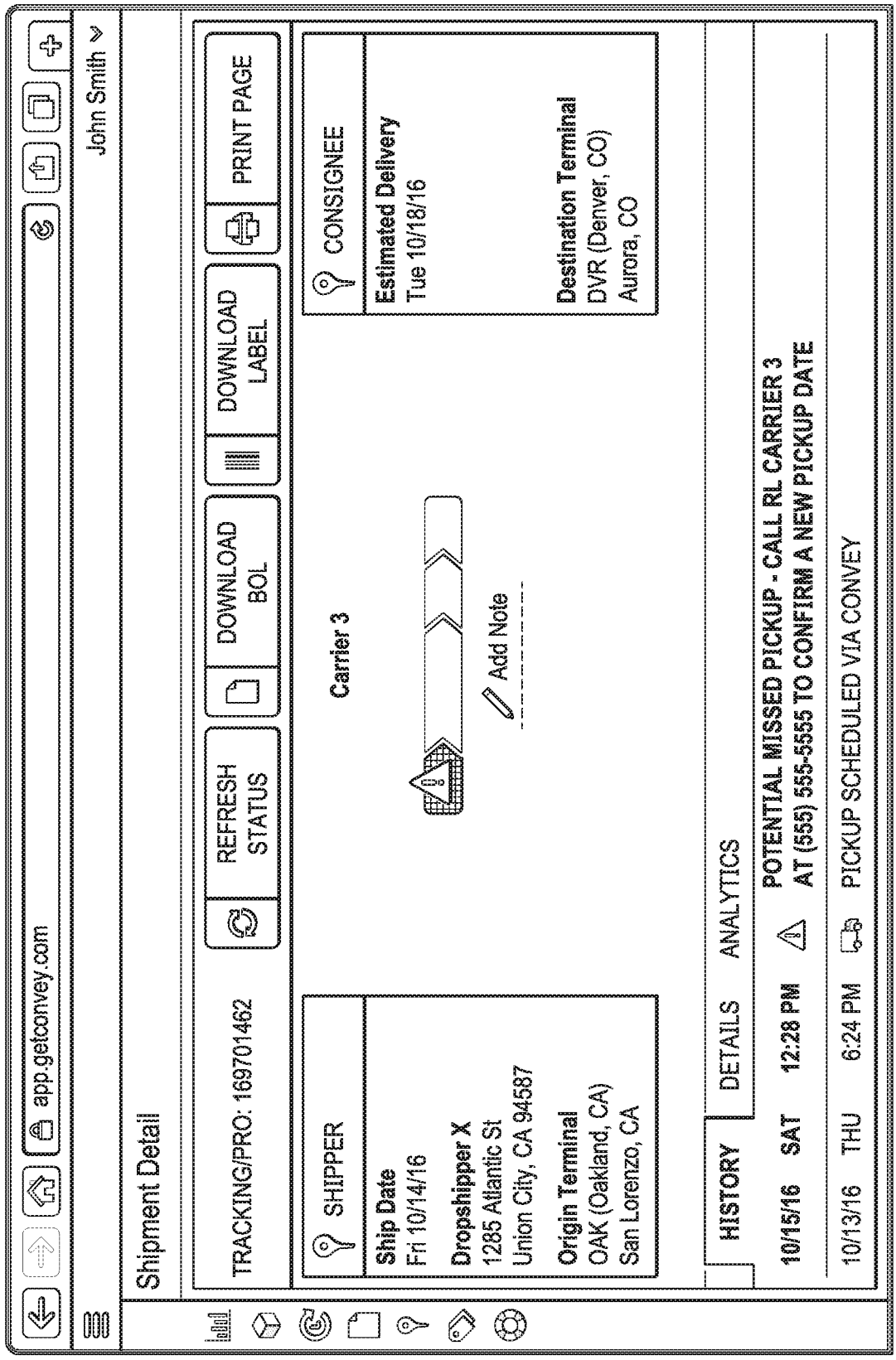
Showing 1 to 10 of 1,749 entries
1 2 3 4 5

FIG. 7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John Smith
Shipment Detail
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REFRESH STATUS
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SHIPPER
Ship Date
Fri 10/14/16
Dropshipper X
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Union City, CA 94587
Origin Terminal
OAK (Oakland, CA)
San Lorenzo, CA
Carrier 3
Add Note
CONSIGNEE
Estimated Delivery
Tue 10/18/16
Destination Terminal
DVR (Denver, CO)
Aurora, CO
HISTORY
DETAILS
ANALYTICS
10/15/16 SAT 12:28 PM
POTENTIAL MISSED PICKUP - CALL RL CARRIER 3
AT (555) 555-5555 TO CONFIRM A NEW PICKUP DATE
10/13/16 THU 6:24 PM
PICKUP SCHEDULED VIA CONVEY

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US17/65348

A. CLASSIFICATION OF SUBJECT MATTER
IPC - G06F 3/048, 17/30; G06Q 10/08, 50/28 (2018.01)
CPC - G06F 3/0482, 17/30867; G06Q 10/083, 50/28

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2016/0335593 A1 (OVERHAUL GROUP, INC.) 17 November 2016; entire document	1-20
A	US 2010/0235303 A1 (LYNCH, D) 16 September 2010; entire document	1-20
A	US 2015/0363843 A1 (UNITED PARCEL SERVICE OF AMERICA, INC.) 17 December 2015; entire document	1-20
A	US 2016/0239788 A1 (ONE STOP MAILING, LLC) 18 August 2016; entire document	1-20
A	US 2015/0006428 A1 (10-4 SYSTEMS, INC.) 01 January 2015; entire document	1-20

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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

Date of the actual completion of the international search	Date of mailing of the international search report
23 January 2018 (23.01.2018)	13 FEB 2018
Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (January 2015)