METHOD AND SYSTEM FOR AUTOMATING INVENTORY MANAGMENT IN A SUPPLY CHAIN

FIELD OF THE INVENTION

The present invention relates to a method of calculating and comparing the levels of inventory to a stored set of parameters, triggering shipment and/or call for shipment/orders, automatic ordering of specific inventory and calculation of freight, shipment documentation processing & transportation costs based on the said order being triggered.

It is no longer simply a efficient supply chain that extrudes cost and operational advantages for manufacturers, suppliers and just about any business organization that relies directly or indirectly on such supply chain lines.

But rather, the introduction of automated processes that are independent of human intervention will add another dimension to the supply chain's ability to reap efficiency benefits.

For example, shipment documentation & processing is now a manual (although there are already efforts to semi-automate them) task, dependent on the actions of human operators (such as to approve of the need to order from suppliers more inventory).

In many instances, such processes can actually be fully automatic, so long as such processes meet several rules based on the level of inventory and its forecast of balances.

In such circumstances, automated processes can also provide a crucial link to existing supply chain software, processing systems, third party shipment information servers etc.

If ordering for more inventory based on specific rules is made automatic, the ordering can also provide a basis for shipment documentation to be simultaneously via electronic means, thereby reducing the latent time between order being trigger to a supplier and order-related documentation being prepared

and ready for freight and transportation approval, cost estimate etc.

SUMMARY OF THE INVENTION

It is the object of the present invention for a method of calculating and comparing the levels of inventory to a stored set of parameters, triggering shipment and/or call for shipment/orders, automatic ordering of specific inventory and calculation of freight, shipment documentation processing and transportation costs based on the said order being triggered.

The invention provides an inventory management system comprising:

an inventory server having a database of inventory products for classifying inventory levels based on predetermined rules comprising at least a critical stock level and a rolling forecast of required stock over a predetermined time period, to enable a product amount data signal to be generated, and output signals generated based on the predetermined rules, the server enabling a supplier or customer to view the output signals over a communication link to facilitate supply or ordering of stock, and to trigger actuation of a request for resupply of stock or stoppage instructions to stop resupply of stock in response to the product position data signal;

a transport server for containing data relating to the transportation of stock to enable transportation costs of stock to be supplied by a potential supplier and/or ordered by a potential customer to be determined so that the total supply and transportation cost of stock can be determined; and

a supply module for activation by the server in response to the trigger activation from the server to call for supply of stock from suppliers or fulfil orders submitted by customers and to generate supply documentation for the supply of stock from suppliers or fulfilment of orders from customers.

The system of the invention therefore enables an inventory of stock to be maintained and for stock to be replenished so that stock is available for supply to customers. The system also enables customers and suppliers to view the inventory status and for transportation costs to be supplied for adding to the inventory cost to determine the total cost of supply and fulfilment of ordering of stock.

In one embodiment the predetermined rules further comprise a minimum stock

level, a current stock committed by single supplier, a multiple supplier commitment level, and wherein the critical stock level is the difference between the current stock committed by a single supplier and the multiple supplier commitment level, and wherein the multiple supplier commitment level is the sum of all the current stock committed by single suppliers.

In one embodiment the inventory server provides the output signals in the form of an XML formatted document that is stored on the server.

Preferably the communication link comprises the internet.

Preferably the communication link is a secured encrypted communications link.

The inventory server and the transport server may be a single server or may be separate individual servers. The supply module may also be part of a single server or of a multiple server system.

In one embodiment of the invention the product amount data signal is generated by the subtraction of the forecast and critical stock level data to provide both status buffer data and the stock position data.

Preferably one of the outputs supplied by the inventory server comprises an inventory status and ageing data.

In another embodiment one of the outputs comprises a consumption status report comprised of transportation data and inventory forecast data to yield a final consumption status report.

In one embodiment of the invention the status buffer data and the critical stock level data are compared to the forecast to produce the product amount signal in the form of an order quantity to trigger activation of the request for resupply of stock.

In one embodiment of the invention the inventory server has a master remote server, a main server memory and at least one data storage device, and wherein the master remote server loads data representing the level of forecast inventory required according to stored parameters in the permanent data storage device and

determines the level of forecast inventory required according to data provided by the master remote server or separate processing systems.

Preferably the master remote server compares the level of forecast inventory with the minimum level of inventory required, critical stock level and current stock committed by single supplier data to determine the nature of the trigger activation so that a determination is made as to whether there is excessive stock levels or shortage due to insufficient buffer stock so that triggering actions can be transmitted by the supply module to either a third party processing system or another system connected to the master server for further electronic processing, including reordering and inventory stoppage instructions.

In another embodiment of the invention the product amount data signal is produced by combining the buffer stock data and minimum stock level data to determine whether the level of forecast inventory required data is adequate and, if not, the server supplies a trigger activation to order additional stock from a predetermined group of suppliers.

In a further embodiment of the invention, the inventory server in response to the trigger activation creates an order message for supply to the order module which causes the order module to match each order message to each order or part specification number from a specification database and consolidates part numbers and identifying data into a look up file.

Preferably the look up file is used by the transport server to determine transportation costs from a database relating to the transportation of stock, and a calculation processor for calculating estimated shipping costs to bring all stocks to be reordered to a particular location.

Preferably the ordering module includes a sub-module for updating the look up file to trigger shipment booking and/or stock ordering together with transportation documentation.

The invention provides an inventory management method comprising:

maintaining a database of inventory products for classifying inventory levels based on predetermined rules comprising at least a critical stock level and a rolling forecast of required stock over a predetermined time period;

producing a product amount data signal, and output signals based on the predetermined rules;

enabling a supplier or customer to view the output signals over a communication link to facilitate supply or ordering of stock;

triggering actuation of a request for resupply of stock or stoppage instructions to stop resupply of stock in response to the product position data signal;

determining transportation costs of stock to be supplied by a potential supplier and/or ordered by a potential customer; and

triggering a call for supply of stock from suppliers based on the product amount data signal or fulfilling orders submitted by customers, and generating supply documentation for the supply of stock from suppliers or fulfilment of orders from customers.

In one embodiment the predetermined rules further comprise a minimum stock level, a current stock committed by single supplier, a multiple supplier commitment level, and wherein the critical stock level is the difference between the current stock committed by a single supplier and the multiple supplier commitment level, and wherein the multiple supplier commitment level is the sum of all the current stock committed by single suppliers.

In one embodiment the output signals are in the form of an XML formatted document that is stored on a server.

Preferably the communication link comprises the internet.

Preferably the communication link is a secured encrypted communications link.

In one embodiment of the invention the product amount data signal is generated by the subtraction of the forecast and critical stock level data to provide both status buffer data and the stock position data.

Preferably one of the outputs supplied by the inventory server comprises an inventory status and ageing data.

In another embodiment one of the outputs comprises a consumption status report comprised of transportation data and inventory forecast data to yield a final

consumption status report.

In one embodiment of the invention the status buffer data and the critical stock level data are compared to the forecast to produce the product amount signal in the form of an order quantity to trigger activation of the request for resupply of stock.

Preferably forecast inventory is compared with the minimum level of inventory required, critical stock level and current stock committed by single supplier data to determine the nature of the trigger activation so that a determination is made as to whether there is excessive stock levels or shortage due to insufficient buffer stock so that triggering actions can be transmitted by the supply module to either a third party processing system or another system connected to the master server for further electronic processing, including reordering and inventory stoppage instructions.

In another embodiment of the invention the product amount data signal is produced by combining the buffer stock data and minimum stock level data to determine whether the level of forecast inventory required data is adequate and, if not, the server supplies a trigger activation to order additional stock from a predetermined group of suppliers.

In a further embodiment of the invention, an order message is created which matches each order message to each order or part specification number from a specification database and consolidates part numbers and identifying data into a look up file.

Preferably the look up file is used to determine transportation costs from a database relating to the transportation of stock, and a calculation processor for calculating estimated shipping costs to bring all stocks to be reordered to a particular location.

Preferably the look up file is updated to trigger shipment booking and/or stock ordering together with transportation documentation.

One embodiment of the invention consists of some basic components as follows:

1. Inventory tracking and forecasting module
2. Multiple location visibility of inventory upon trigger/rule activation
3. Electronic ordering of inventory and automatic documentation processing and cost of transportation/freight calculation.

Inventory tracking and forecasting module

The invention has a rule-based system whereby inventory levels are classified according to the following classes:

Minimum stock level (MSL)
Critical stock level (CSL)
Current stock committed by single supplier (CSGL)
Multiple supplier commitment level (MSCL)

In the first embodiment of the present invention, the system will accept electronic input of data relating to the mentioned forecast data (Minimum, critical stock levels & multiple supplier commitment level), and generate a result or output data based on the following manner;

CSGL - MSL = CSL

Where CSL (1) + CSL (2) + CSL (3) = MSCL

Preferably, each CSL derived will be added to other values that are obtained from other suppliers within a pre-determined database of suppliers to a single or group of manufacturers.

The said system whereby inventory levels are calculated can be in a XML formatted document that is then stored on a suitable server that is capable of allowing a registered computer account to view the consolidated or entire XML document via a electronic communications network such as the Internet.

This is preferably secured with a connection between the computer account and the said server via a SSL encrypted communications link via the Internet.

Multiple location visibility of inventory upon trigger/rule activation

The present invention can, upon several conditions that are stored onto a computer server (via a electronic database), compare and calculate the output values obtained, and generate a electronic signal to cause a suitable software program to display the contents of the values derived from the data inputs.

Electronic ordering of inventory and automatic documentation processing and cost of transportation/freight calculation

The present invention can allow for the generated output values to immediately look for another database containing detailed specifications on each physical component of the inventory concerned.

Upon the collection of detailed specifications of each inventory component that corresponds to whatever short-fall and/or order requirement that is the result of the said value calculation, the present invention can make use of the said specifications to calculate the cost and rates of transportation and other related logistics and handling charges needed to order and transport the said inventory from a named seller to a designated collection hub.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be more clearly ascertained, preferred embodiments will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic view of the entire process whereby a forecast of inventory levels required by a customer will be automatically fed into an electronic system which will in turn calculate the level of inventory available in all registered storage facilities, and compute any excess or shortfall levels for escalation to another connected electronic system for further action.

Figure 2 is a diagram showing how the electronic system can determine the level of inventory that should be ordered from suppliers connected to the said system under the condition whereby the forecasted level of inventory required by the customer is assumed greater than the critical and/or minimum level of inventory.

Figure 3 is a systemic diagram showing how the said electronic system will trigger an electronic order from any number of registered suppliers more inventory composing of any number of individual items or components automatically upon the calculation of a shortfall of inventory that is required.

Figure 4 is a systemic diagram illustrating the method and process whereby the automatic ordering action by the said system will cause any number of connected computer devices to calculate the estimated cost of shipping a specific number or level of inventory from any number of registered suppliers to any number of storage locations that will subsequently make available the said inventory to the customer based on the system's ordering specifications.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

According to a first embodiment of the present invention, there is provided a method of calculating and comparing the levels of inventory to a stored set of parameters, triggering shipment and/or call for shipment/orders, automatic

ordering of specific inventory and calculation of freight, shipment documentation processing & transportation costs based on the said order being triggered.

The implementation of the first embodiment is via a series of apparatus that includes the following;

A master remote server comprising of a database, operating system & software application capable of transmitting and receiving TCP/IP data (such as an Internet browser);

A server registry that contains another separate database detailing information such as freight rates published by another third party, shipping and transportation data etc.;

A inventory registry that contains another separate database detailing information relating to inventory levels and/or availability as electronically published by any registered user or other remote server that is connected to the said inventory registry;

With reference to Figure 1, and according to the second preferred embodiment of the present invention, a party will route (01) XML data (or data in other formats such as EDI, text file, HTML, SQL, DHTML etc.) to a master remote server that will perform authentication with both server registry and inventory registry prior to submitting said XML data to either registry for further processing.

The server registry will perform a look-up from at least 1 database containing (02) a 13 week rolling forecast data, and perform a pre-determined set of operations and/or parameters as stored in the said server and/or registry.

The said registry will subtract the (02) 13 week forecast data from a (03) critical stock level data that is stored onto either the said registry or another database residing within another inventory registry and/or remote server.

The subtraction will yield both the (04) receiving status buffer data and (05) automatic stock position data, of which both will determine the actions the present invention will perform onto another series of remote servers connected to

any number of registered users.

According to the third preferred embodiment of the present invention, the master remote server may make reference to data parameters stored on the said registry server (by matching database data to received XML data for processing using database operations such as SQL functions including but not limited to search, add, subtract, compare etc.).

In this preferred embodiment, the master remote server may make use of information received to further process using stored database parameters to generate a set of action messages for implementation by the same master remote server or any connected information system.

The master remote server may also make use of secondary data from any connected database containing information such as shipping information, freight rates, inventory forecast data etc. to calculate and yield a final (07) consumption status report of the supply chain under monitoring by the present invention.

According to the fourth preferred embodiment of the present invention, the (07) consumption report data generated by the said master remote server will be used to further process by sending electronic purchasing information to a third party such as inventory suppliers and/or customers (consignees).

With reference to Figure 2, and according to the third preferred embodiment of the present invention, the master remote server may cause any number of connected servers to send and receive data for execution with another third party, such as triggering inventory ordering or generation of stoppage of additional orders directly to a pre-determined number of suppliers adapted to receive said orders.

Using (A1) a 13 week forecast information of the expected quantity and details of inventory material required by a single or group of customers connected to the operator of the present invention, the master remote server will also compare the total forecast data to (A2) critical stock level and (A3) receiving status buffer to arrive at a order quantity that would be suitable for triggering to said suppliers.

The master remote server may build a database containing the following data for further processing in order to perform and implement the third embodiment of the present invention;

A master remote server;
Main server memory;
At least 1 permanent data storage device;

With reference to Figure 2, said server shall load (A4) data representing level of forecast inventory required according to stored parameters that will determine the said level according to further data that may be provided by said server or any number of separate processing systems.

The (A4) data may be compared against the minimum level of inventory required (MSL), critical stock level (CSL) and current stock committed by single supplier (CSGL) data.

With reference to Figure 2, the secondary data (A5, A6 and A7) are matched against (A4) forecast inventory data, and resulting information (whether there is excessive stock levels or shortage due to insufficient buffer stock) will determine the triggering actions to be transmitted by the master remote server to either a third party processing system or another server connected to the said master server for further electronic processing including but not limited to inventory purchaser orders, inventory stoppage instructions etc.

With reference to Figure 3, the level of (B4) buffer stock, combined with the minimum stock level (B2) is inadequate to meet the total level of forecast inventory required (B1), thereby causing the said master remote server to relay or trigger ordering of a calculated level of inventory (materials or parts) from a pre-determined group of inventory suppliers.

With reference to Figure 4, and according to the fourth preferred embodiment of the present invention, the master remote server will determine the level of buffer inventory to order (10), thereby triggering a order message from the said server to a ordering module (20), causing ordering module (20) to match each said order message (10) to each order or part specification number from a

specifications database (30), further allowing said database to consolidate all part numbers and/or inventory specification/material number/ID to be included into a look-up file (40).

The (40) look-up file will composed of message data including;

File header information
Date and file creation data
File owner

File message DTD
Message tag and/or XML tags

Inventory specification message
Inventory specification tag

File end

The present invention will also make use of the (40) look-up file to generate a separate (50) shipping, transportation and freight transcript file that will be used to calculate and provide a scope of expenses that is required for the ordering of the said inventory.

Said transcript (50) will cause master remote server to generate a file containing shipping rates and may apply additional rates to further incorporate said additional rates with said shipping rates into another document for transmission to a third party.

The present invention will therefore be capable of automatically operating the entire supply chain ordering, matching, inventory tracking, transport, storage, freight and shipping events by means of accepting suitable data from any registered user or processing system connected to the said master remote server.

Modifications within the spirit and scope of the invention may readily be effected by persons skilled in the art. It is to be understood, therefore, that this invention is not limited to the particular embodiments described by way of example hereinabove.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An inventory management system comprising:

an inventory server having a database of inventory products for classifying inventory levels based on predetermined rules comprising at least a critical stock level and a rolling forecast of required stock over a predetermined time period, to enable a product amount data signal to be generated, and output signals generated based on the predetermined rules, the server enabling a supplier or customer to view the output signals over a communication link to facilitate supply or ordering of stock, and to trigger actuation of a request for resupply of stock or stoppage instructions to stop resupply of stock in response to the product position data signal;

a transport server for containing data relating to the transportation of stock to enable transportation costs of stock to be supplied by a potential supplier and/or ordered by a potential customer to be determined so that the total supply and transportation cost of stock can be determined; and

a supply module for activation by the server in response to the trigger activation from the server to call for supply of stock from suppliers or fulfil orders submitted by customers and to generate supply documentation for the supply of stock from suppliers or fulfilment of orders from customers.

2. The system of claim 1 wherein the predetermined rules further comprise a minimum stock level, a current stock committed by single supplier, a multiple supplier commitment level, and wherein the critical stock level is the difference between the current stock committed by a single supplier and the multiple supplier commitment level, and wherein the multiple supplier commitment level is the sum of all the current stock committed by single suppliers.

3. The system of claim 1 wherein the inventory server provides the output signals in the form of an XML formatted document that is stored on the server.

4. The system of claim 1 wherein the communication link comprises the internet.

5. The system of claim 4 wherein the communication link is a secured encrypted communications link.

6. The system of claim 1 wherein the product amount data signal is generated by the subtraction of the forecast and critical stock level data to provide both status buffer data and the stock position data.

7. The system of claim 1 wherein one of the outputs supplied by the inventory server comprises an inventory status and ageing data.

8. The system of claim 1 wherein one of the outputs comprises a consumption status report comprised of transportation data and inventory forecast data to yield a final consumption status report.

9. The system of claim 6 wherein the status buffer data and the critical stock level data are compared to the forecast to produce the product amount signal in the form of an order quantity to trigger activation of the request for resupply of stock.

10. The system of claim 6 wherein the inventory server has a master remote server, a main server memory and at least one data storage device, and wherein the master remote server loads data representing the level of forecast inventory required according to stored parameters in the permanent data storage device and determines the level of forecast inventory required according to data provided by the master remote server or separate processing systems.

11. The system of claim 10 wherein the master remote server compares the level of forecast inventory with the minimum level of inventory required, critical stock level and current stock committed by single supplier data to determine the nature of the trigger activation so that a determination is made as to whether there is excessive stock levels or shortage due to insufficient buffer stock so that triggering actions can be transmitted by the supply module to either a third party processing system or another system connected to the master server for further electronic processing, including reordering and inventory stoppage instructions.

12. The system of claim 11 wherein the product amount data signal is produced by combining the buffer stock data and minimum stock level data to determine whether the level of forecast inventory required data is adequate and, if not, the server supplies a trigger activation to order additional stock from a predetermined group of suppliers.

13. The system of claim 1 wherein the inventory server in response to the trigger activation creates an order message for supply to the order module which causes the order module to match each order message to each order or part specification number from a specification database and consolidates part numbers and identifying data into a look up file.

14. The system of claim 13 wherein the look up file is used by the transport server to determine transportation costs from a database relating to the transportation of stock, and a calculation processor for calculating estimated shipping costs to bring all stocks to be reordered to a particular location.

15. The system of claim 14 wherein the ordering module includes a sub-module for updating the look up file to trigger shipment booking and/or stock ordering together with transportation documentation.

16. An inventory management method comprising:

maintaining a database of inventory products for classifying inventory levels based on predetermined rules comprising at least a critical stock level and a rolling forecast of required stock over a predetermined time period;

producing a product amount data signal, and output signals based on the predetermined rules;

enabling a supplier or customer to view the output signals over a communication link to facilitate supply or ordering of stock;

triggering actuation of a request for resupply of stock or stoppage instructions to stop resupply of stock in response to the product position data signal;

determining transportation costs of stock to be supplied by a potential supplier and/or ordered by a potential customer; and

triggering a call for supply of stock from suppliers based on the product amount data signal or fulfilling orders submitted by customers, and generating supply documentation for the supply of stock from suppliers or fulfilment of orders from customers.

17. The method of claim 16 wherein the predetermined rules further comprise a minimum stock level, a current stock committed by single supplier, a multiple supplier commitment level, and wherein the critical stock level is the difference

between the current stock committed by a single supplier and the multiple supplier commitment level, and wherein the multiple supplier commitment level is the sum of all the current stock committed by single suppliers.

18. The method of claim 16 wherein the output signals are in the form of an XML formatted document that is stored on a server.

19. The method of claim 16 wherein the communication link comprises the internet.

20. The method of claim 19 wherein the communication link is a secured encrypted communications link.

21. The method of claim 16 wherein the product amount data signal is generated by the subtraction of the forecast and critical stock level data to provide both status buffer data and the stock position data.

22. The method of claim 16 wherein one of the outputs supplied by the inventory server comprises an inventory status and ageing data.

23. The method of claim 16 wherein one of the outputs comprises a consumption status report comprised of transportation data and inventory forecast data to yield a final consumption status report.

24. The method of claim 21 wherein the status buffer data and the critical stock level data are compared to the forecast to produce the product amount signal in the form of an order quantity to trigger activation of the request for resupply of stock.

25. The method of claim 16 wherein forecast inventory is compared with the minimum level of inventory required, critical stock level and current stock committed by single supplier data to determine the nature of the trigger activation so that a determination is made as to whether there is excessive stock levels or shortage due to insufficient buffer stock so that triggering actions can be transmitted by the supply module to either a third party processing system or another system connected to the master server for further electronic processing, including reordering and inventory stoppage instructions.

26. The method of claim 21 wherein the product amount data signal is produced by combining the buffer stock data and minimum stock level data to determine whether the level of forecast inventory required data is adequate and, if not, the server supplies a trigger activation to order additional stock from a predetermined group of suppliers.

27. The method of claim 16 wherein an order message is created which matches each order message to each order or part specification number from a specification database and consolidates part numbers and identifying data into a look up file.

28. The method of claim 27 wherein the look up file is used to determine transportation costs from a database relating to the transportation of stock, and a calculation processor for calculating estimated shipping costs to bring all stocks to be reordered to a particular location.

29. The method of claim 28 wherein the look up file is updated to trigger shipment booking and/or stock ordering together with transportation documentation.