Web based Supply Chain Management System

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Abstract

A supply chain is a network of suppliers, factories, warehouses, distribution centers and retailers, through which raw materials are acquired, transformed, produced and delivered to the customer [1]. An effective and efficient way of managing this network is called a Supply Chain Management System (SCMS). The purpose of this project is to analyze and design a Web-based generic SCMS. As such, the project requires an understanding of supply chain management practices and a melding of that understanding with Web-based software development and operation.

1. Motivation

Being a complex network of suppliers, factories, warehouses, distribution centers and retailers, the success of any SCMS depends on how well these system components are managed. In recent times information has become a key player in determining the productivity of a complex enterprise. The enterprise's ability to process information and make rapid but right decisions promises growth. In such a scenario it is necessary to forecast and estimate the demand, supply raw materials to the point of sale locations on and reorganize the business structure if necessary. To realize these goals a system must seamlessly integrate both information and material flow. Such a system can provide access to information, aid decision-making and execution.

Content of the paper: The rest of this paper first elaborates the components of our system in Section 2. Section 3 details the use cases followed by references.

2. Components

Traditionally, marketing, distribution, planning, manufacturing, and the purchasing organizations along the supply chain operated independently. These organizations have their own objectives and these are often conflicting. Clearly, there is a need for a mechanism through which these different functions can be integrated together. Supply chain management is a strategy through where such integration can be achieved [2].

Based on our study three important components are deemed essential for a web based generic SCMS – the outlet or the point of sale location, supplier who delivers goods to the outlets and a central system that monitors and manages the operations of the other two components. As retail and wholesale organizations haves stores scattered across many places the web is utilized as the media for information exchange.

2.1 Components of BSCMS:

a) OMS (Outlet Monitor System)
b) CCS (Central Control System)
c) SMS (Supplier Management System)

2.1.a OMS (Outlet Monitor System)

The outlet represents the actual "point of sale" where the goods sold to the customer. The *OMS* at each outlet keeps track of the inventory at a particular outlet. Based on regular intervals of time every *OMS* communicates with the CCS to submit information and relay the present state of its inventory.

2.1.b SMS (Supplier Management System)

A *supplier* or the *provider* acts as the source of the raw materials. The supplier responds and caters to the requests of the CCS and dispatches new inventory to the outlets on demand. The SMS also assists in determining the mode of distribution and the possible paths that can be utilized in channeling the raw materials to the outlets.

2.1.c CCS (Central Control System)

The CCS forms the core of the system that monitors, controls and manages the OMS and SMS. This setup is in charge of processing the information from different OMS's and relaying requests to the appropriate SMS to send new inventory to the particular outlets. Processing of information includes the calculation of lead-time, the threshold level and the amount of inventory to be sent to the outlet. Apart from these the CCS can offer the following statistical information which includes, but not limited to: buying patterns, warehouse deployment strategies, shipment optimizations, geographical location of production facilities, stocking and sourcing points etc.

2.2 Block Diagram

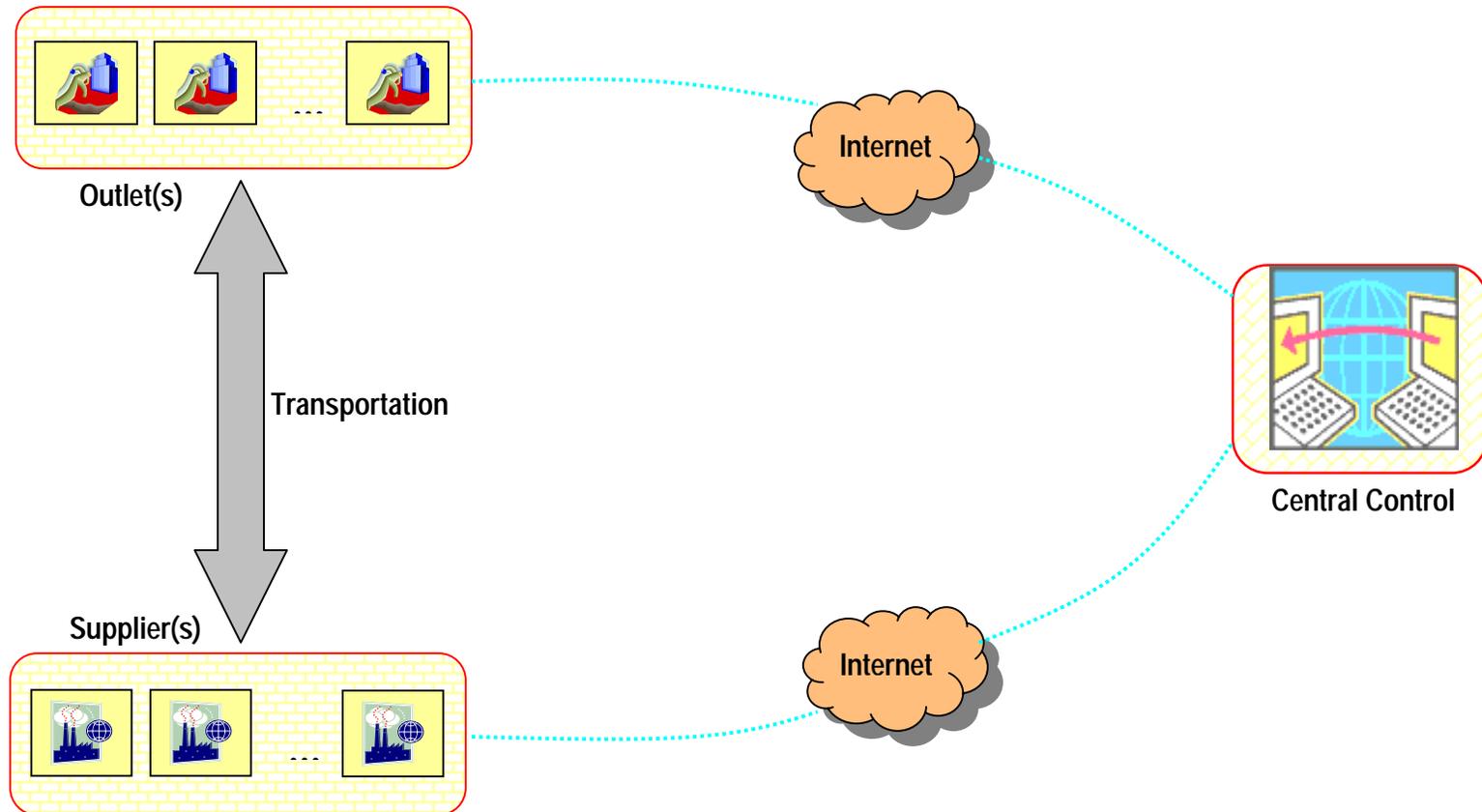A block diagram (Figure 1) represents the aforementioned activities:

Outlet(s)

Transportation

Supplier(s)

Internet

Central Control

Internet

Figure 1 –Representation of the model

3. Use Cases

Use Case #1: Monitor product sales.

Goal in Context: The OMS monitors and records product sales at each outlet.

Description: A customer visits an outlet store and picks up commodities to make a purchase. When these products are billed, for each and every product sold to the customer an entry is made. The status of the inventory thus remains current and is readily available to be relayed to the CCS. The primary entries include product ID, quantity sold, and other related information about the purchase.

Use Case #2: OMS sending information.

Goal in Context: The OMS sends periodically the current inventory information to the CCS.

Description: The OMS keeps track of all the products sold by updating the product information database each time a product is sold and checked out of the store. Periodically the appropriate inventory information of all the products for an outlet is sent to the Central Control System, the CCS. This helps the outlet to keep the CCS informed about the latest status of all the products at the outlet and the products required.

Use Case #3: CCS processing information.

Goal in Context: The CCS processes the incoming information to take delivery decisions.

Description: The CCS processes the incoming information from the OMS about the latest inventory status at each outlet. It then examines the product demand and comes up with the threshold level, which is utilized to judge when and how much inventory has to be sent to that particular outlet. The CCS also evaluates the supply availability.

Use Case #4: CCS placing order.

Goal in Context: The CCS places order to a supplier.

Description: The CCS after determining the current demand for each product at each outlet, places an order to the corresponding supplier by delivering information which includes products required, quantity and the outlet location. After placing the order for the products, the CCS updates its local database and keeps track of the total orders placed for each product and for any given outlet.

Use Case #5: Servicing product request.

Goal in Context: The SMS processes the product request submitted by the CCS and dispatches the requested quantity of products to the corresponding outlet.

Description: The SMS processes the product request submitted by the CCS. It services the order by setting up appropriate quantities for all the requested products. The SMS then dispatches the products to the appropriate outlet(s).

Use case #6: Order receipt acknowledgement.

Goal in Context: The Outlet intimates the order receipt to the CCS.

Description: When the OMS receives the order it updates its local database with the information regarding the new inventory and also sends an acknowledgement to the CCS intimating about the inventory received.

References

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