

Inventory Management System Automation for Coherency in E-Commerce Web Portals

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Abstract:- This paper proposes multi-channel e-commerce solution that incorporates a single interface to provide effortless sale benefits to a retailer. The problem faced by retailers is maintaining all the e-commerce web portals. If a product is out of stock yet it is showing available in any web portal as explained in the problem below, a black mark is placed on the retailer by that web portal. This may result in withdrawal of membership of the retailer from that portal. Our solution proposes an interface which provides one-time insertion of products and efficient updating process between channels for coherency.

Keywords: multi-channel, E-commerce, interface, retailer, inventory, consistency, coherency.

1. Introduction

Online shopping is a form of electronic commerce which allows consumers to directly buy goods or services from a seller over the internet using a Web browser. An online marketplace (or online e-commerce marketplace) is a type of e-commerce site where product or service information is provided by multiple third parties, whereas transactions are processed by the marketplace operator. Online market places are the primary type of multichannel e-commerce.

In an online marketplace, consumer transactions are processed by the marketplace operator and then delivered and fulfilled by the participating retailers or wholesalers. The marketplaces provide the retailers with vendor portals through which they can manage their products which include addition, deletion and updating of products.

The fundamental problem faced by the vendors/retailer is to manage multichannel e-commerce where a vendor may have products in different ecommerce portals. They have a single inventory, but sell across multiple channels. If a product is sold in any one channel, for instance on flipkart, then the available stock sale will have to be updated for all other sales channels.

The proposed solution provides a common interface to add a new product and update the stock level if a sale is made in any particular channel. The system also provides product wise, month wise and channel wise sales analytics to the retailers.

2. Related Work

PriyaEnterprises is a retailer who owns a retail bag store and also a registered member of flipkart and eBay. They face the

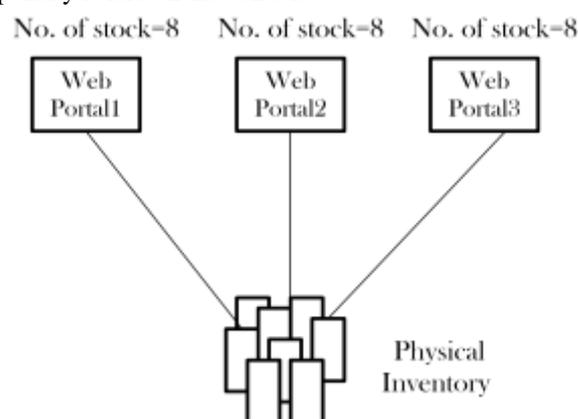
problem of managing the inventory as it involves manual effort of updating the stock level when a sale occurs in any one channel.

The survey made also explains the difficulty faced by the retailer in knowing the strategies to be used for the sale.

3. Problem Statement

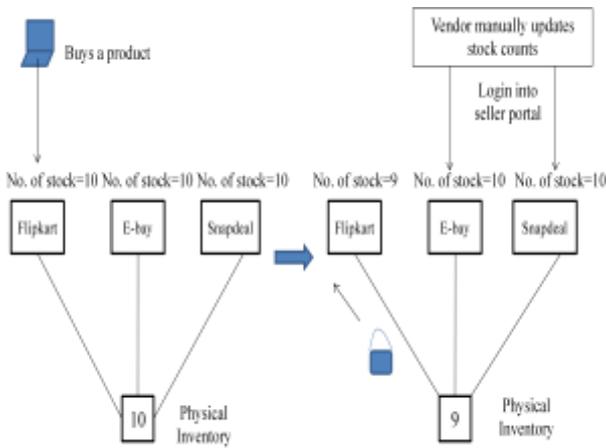
Maintaining a common inventory for all the E-commerce portals and physical store for a vendor is tedious because human intervention is required to update the inventory status in each of the portal while a product is sold in any of the E-commerce portal or physical store.

The same physical store inventory should reflect in all the online portals. If there is inconsistency in the inventory and an order is placed for an item which is not available, a penalty is laid on the vendor.



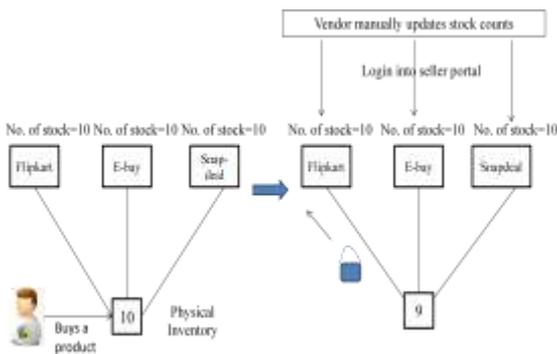
3.1 Sale via online web-portal

E-commerce portals have their own databases maintained which are not shared with each other. This mandates manual intervention to update inventory status by vendor.



3.2 Sale in a physical store

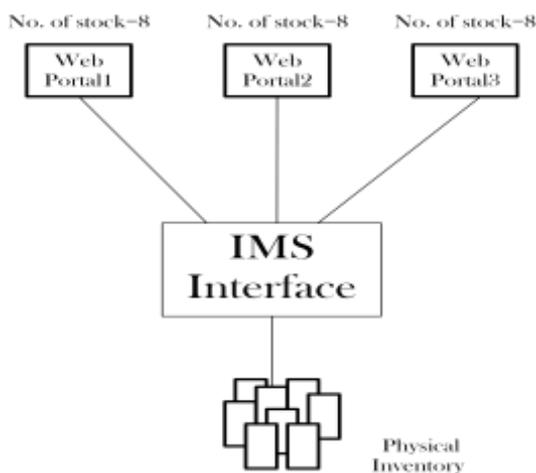
Whenever a sale is made in a physical store, the vendor himself has to login to every web-portal he/she has registered to and update the stock details of the sold product.



4. Proposed System

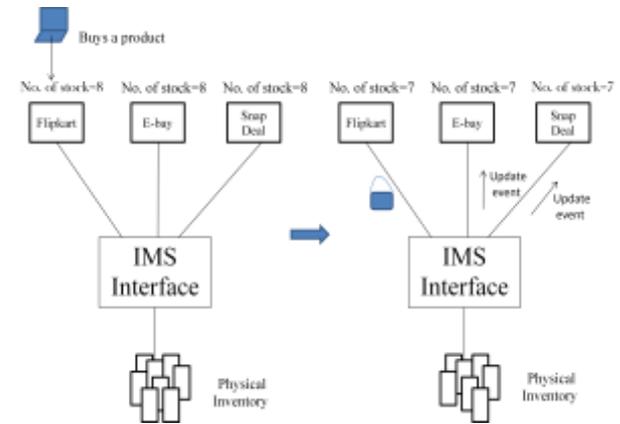
The proposed system consists of an interface which automates the process of maintaining consistency in the inventory statuses of the E-commerce portals.

This avoids the problem of having different inventory for each web-portal.



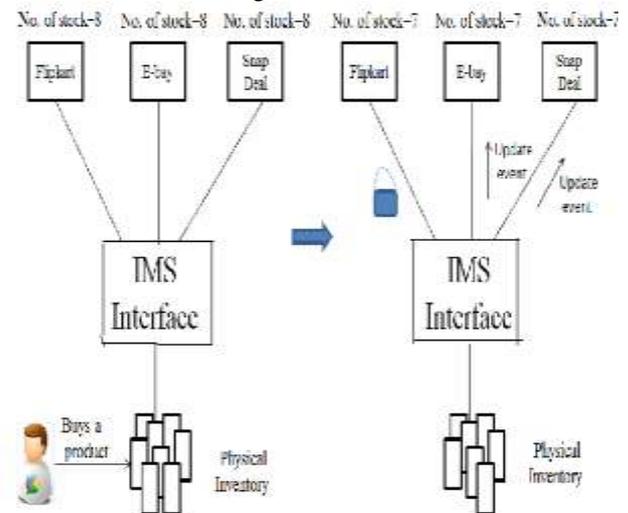
4.1 Web Portal sale with IMS

When a customer buys a product in any of the web portal, then the IMS interface updates the stock details of the sold product in all other web portals to which the vendor has registered, except the one in which the sale was made.



4.2 Retail store sale with IMS

When a customer buys a product in a retail store, the IMS interface updates the stock details in all the web portals to which the vendor has registered.



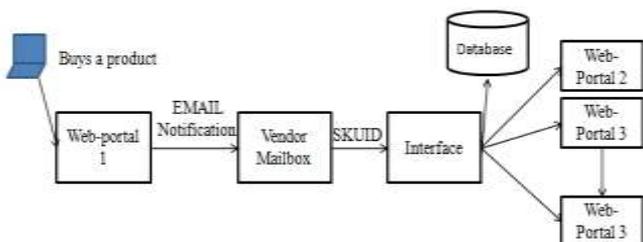
5. Methodology

5.1 Sale in a web portal

When a customer buys a product in an e-commerce portal, the stock level of the product gets updated automatically in that web-portal. But the stock level of the same product published in other web-portals is unaffected. This is because all the web-portals are independent. IMSAC (Inventory Management System Automation for Coherency) makes these web-portals related by reflecting the sale of a product in one web-portal in other web-portals.

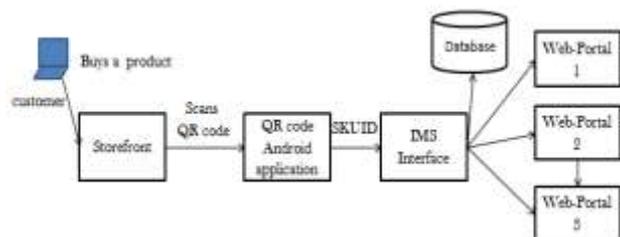
Firstly, the sale in a web-portal has to be detected. Every e-commerce portal intimates the vendor about the sale through an email to the registered email id of the vendor. The email contains information such as order number, SKUID (Stock keeping unit) which is unique to every product, quantity, cost, address of the customer, date and time of sale. IMSAC

keeps a watch on vendor mailbox. Whenever a new mail arrives, it checks the subject of the mail by matching it with the subject of the standard format of the regular sale then the body of the mail is fetched. JavaMail API is used to utilise the mail's content. Once the details pertaining to the sale is obtained, the centralised database maintained by IMSAC is updated. The stock level of the sold product in other web-portals must get updated. For this, web scraping technology is used which automates the manual actions in a website. In every other web-portal, IMSAC logs in to the seller portal using vendor's credentials, checks if the product is present in its listing, if present, the stock level of that product gets updated. After successful revision, the account gets logged out. The same will be repeated for every other web-portal for which the seller is registered.



5.2 Sale in a storefront

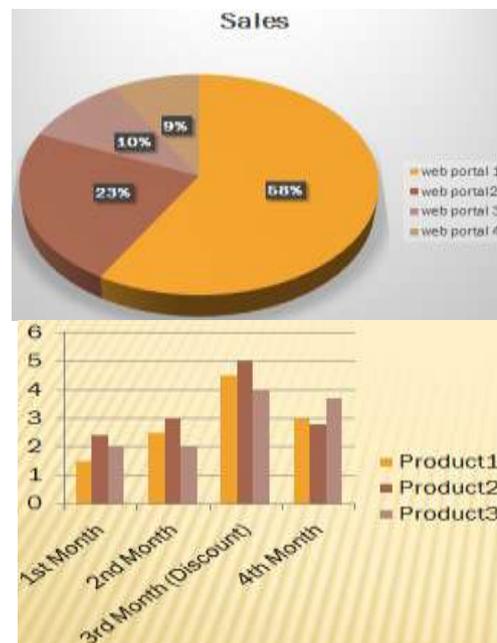
As discussed earlier, the vendor maintains single inventory for all the sales channels including retail store. When a customer purchases a product in retail store, that particular sale has to be captured. For this purpose IMSAC is integrated with an android application. This mobile application implements a QR code scanner and incorporates other functions like generating and sending a mail to a hardcoded email id. A QR code sticker must be pasted on every product in the inventory. This sticker holds information such as product's SKUID and the product name. Whenever there is a sale in retail store, the vendor has to scan the QR code stuck on the product before giving away the product. Once scanned, it has to be mailed to the vendor's mailbox in a standard format. The format of the mail will be taken care by the android application. As the mailbox is under watch, if the subject of the mail specifies retail store sale, SKUID of the product is fetched from the body. IMSAC uses this data to update the centralised inventory. It also invokes an update event to all the registered web-portals. If the product is present, then the stock level of the product gets revised. If the product is not published in a particular web-portal then there will no changes in that web-portal and moves on to the next.



5.3 Data Analytics

In multi-channel environment, every transaction that happens in a web-portal or a storefront is captured and

stored in a centralised database. This data can be transformed into useful information helpful for the vendor. Data can be analysed in many ways including product wise, month wise and outlet wise sales. Analytics can be shown through variety of graphs such as bar graph, pie chart etc. Business Intelligence Reporting Tool(BIRT) is used for this purpose.



6. Conclusion

The system provides a complete solution for the easy maintenance of multi channel E-commerce portals. It is automatic; helps the vendor to save his time in manual intervention and increase his sales. The system requires 24/7 Internet connection without which it cannot run. Whenever the website layout changes, the system should also undergo changes. The system should be customized according to the requirements of each vendor.

7. Future Enhancements

1. If the product after sale is returned in any one of the E-commerce web portals, then system should automatically update the stock level in all other E-commerce web portals.
2. Similarly if the product is cancelled before the sale in any one of the e-commerce web portals, then system should automatically update the stock level in all other E-commerce web portals.

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