

# Solving the Out-of-Stock Problem

A startup software company is using RFID data to create a new type of planning and replenishment engine aimed at making sure products are available when customers want to buy.

By Mark Roberti

June 23, 2004—Improving supply chain efficiency is great, but what retailers and manufacturers really want is to increase sales. One way RFID technology can help them to boost the top line is by providing the visibility needed to reduce the number of times a product is out of stock when a customer wants to buy it. But increased visibility alone can't ensure that product is where it needs to be at any given time, so a startup software company is taking a new approach to addressing the out-of-stock problem.

Truth Software, a Menlo Park, Calif.-based software company, recently unveiled an alpha version of an application called True Demand, which combines conventional forecasting models with additional data from RFID systems to try to better predict impending out-of-stocks.

The company was founded by Raymond Blanchard, formerly SAP's business development director for auto-ID solutions for manufacturing; Hau Lee, the Thoma professor of operations, information and technology at Stanford University's Graduate School of Business; and Jie Weng, formerly a research scientist at SAP.

"The application that delivers the most value—the one that reduces out-of-stocks and improves inventory turns—is the toughest to do," says Blanchard. "One day, Hau Lee came to me and said he'd cracked it; he'd figured out how to use new RFID data in a new type of multilevel forecasting and replenishment application."

With backing from Mayfield, a venture capital firm, Blanchard, Weng and Hau set up Truth Software, which was formally incorporated in March. The company's first application uses conventional planning based on point-of-sale data and orders from retailers. But it adds new "event" data that will come from RFID, including the arrival of a shipment of goods at a retailer's distribution center, the outbound shipment of goods from the retailer's DC to a store, arrival at the store, and consumption of that case in the store (Wal-Mart and others are setting up RFID readers at trash compactors in the back of their stores to read the tags on empty cases of goods that have been moved onto the selling floor).

"We're using the actual shipping and receiving information as an input into our model because that data provides the added certainty of actual shipping and receiving times, fulfillment rates and lead times," says Blanchard. "Then, we are using the case consumption as a proxy for demand, to both better anticipate impending out-of-stocks and provide the recommended replenishment quantity that will prevent them."

Most planning engines today use orders from retailers and POS data to forecast demand. But when a retailer places an order each week for a certain amount of razors or corn flakes, the manufacturer typically takes a week to send replenishments to the store. The manufacturer doesn't know whether the retailer has one day's inventory on hand or one week, so it can't respond to a potential out-of-stock situation.

With RFID technology, retailers will be able to provide manufacturers with information about what was shipped from a distribution center to specific stores and which cases were consumed at that store. By using

this information, True Demand provides the manufacturer with near-real-time information about what inventory is on hand in the store, and the software uses the consumption of cases and POS data to forecast retail replenishment orders more accurately. Therefore, the manufacturer is better able to allocate inventory to fulfill the orders that come in.

So let's say Campbell Soup Co. is selling three cases of Chicken & Stars at a Wal-Mart in Topeka, Ka. That information from the Wal-Mart POS is confirmed by RFID tags read on cases thrown into the trash compactor. By knowing exactly how many cases were shipped to the Topeka store and how many cases have been sold there, Campbell knows exactly how much inventory is on hand in that store and how long it will last.

If there are only six cases left in the store and the next shipment from the retail DC is not due for four more days, the True Demand software will recommend that the retailer replenish sooner from its DC. (The software can automatically send an e-mail alert to the retailer, although the retailer may or may not act on that alert.) Campbell then looks at the DC fulfilling the replenishment request and sees that the DC has only enough inventory on hand to fill two days worth of consumption, so to enable the retailer to prevent an out-of-stock at that distribution center, the manufacturer ships more cases of Chicken & Stars to the DC. Goods begin to be pulled through the supply chain rather than pushed based on forecasts, as happens today.

If a manufacturer buys the Truth Software application, it can let its retail partners see the shipments the manufacturer is making to the DCs and expected arrival dates and times. The retailer can see how many days of inventory it has on hand, the impending out-of-stocks by store and stock keeping unit (SKU), and the recommended inventory shipments from the retailer's DC to the stores to prevent those out-of-stocks. The retailer can accept, reject or modify the recommendation and notify the manufacturer of the action it plans to take, so the manufacturer is better able to allocate its inventory and adjust production.

"Traditionally, these planning applications are sold to the manufacturers and the retailer may buy different planning engines, and there is no coordination," says Blanchard. "We are approaching out-of-stocks and inventory management as a single network problem."

True Demand gets data from three sources. Event data comes from RFID middleware. Product data is pulled from SAP and other enterprise resource planning (ERP) software by enterprise application integration tools. And point-of-sale data comes from electronic data interchange networks, extranets run by retailers or private electronic exchanges. True Demand then uses conventional middleware to send requests for replenishment orders and other transactions to a company's existing ERP system.

The software is written in Java and is expected to be for sale by the end of the year. Right now, the alpha version can take current supply chain data from conventional warehouse management, replenishment, ERP and point-of-sale applications, combined it with current RFID data and produce a test simulation that can be compared with a company's existing forecasts and production plan.

Truth Software plans to add functionality to the final release of the product. The application will estimate lost unit sales based on inventory shortfalls. It will give retailers visibility into the manufacturers' inventory and future shipments so retailers can better plan promotions, and it will enable retailers to inform manufacturers when excess inventory at one store or DC has been routed to another, so the manufacturer can include this information in forecasts.

"What True Demand will do is predict retailer orders, show current inventory velocity, service levels, and days of sales by product and location and provide orchestrated replenishment and allocation requirements for manufacturers and retailers," Blanchard says. "The new RFID data will provide greater inventory visibility, but we add value to that visibility and utilize it in our application to provide greater certainty of how much

inventory to produce, ship and allocate, resulting in higher inventory service levels and turnover rates. This application can prove the business case for using RFID, which is what everyone is struggling with."

Blanchard says that even though many manufacturers will put RFID tags only on a few products shipped to a few retail DCs next year, the manufacturers can begin to get real value from this new replenishment application because the application could improve sales by 2 to 3 percent—through reduced out-of-stocks—and it can improve inventory turnover by 20 to 28 percent for the average Wal-Mart top 100 supplier.

"When you consider the average revenue per store for some of these big manufacturers, if you improve sales by 2 to 3 percent for even one SKU, that could result in \$2 to \$4 million in the first year in improved sales," he says. "And we estimate that True Demand could improve inventory turnover rates by 28 percent. For the top 50 CPG companies, that would reduce inventory by three weeks, or 3 percent of revenue. If manufacturers can get a couple of million in cash through improved sales and free up working capital tied up in that inventory, that's some return back that they otherwise wouldn't get."

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