

A deceptively simple application provided big value because it was precisely focused on the core domain, and because the model was iteratively refined in parallel with the business process to capture nuances of the problem, with a good sense of what people do well and where software helps. Coordination of business process rollout and software development allowed just-in-time delivery that mitigated a serious business risk. [EDE]

School Startup System Hits the Mark

By Tony Canty, CIO, Labatt Food Service

Summary

All distribution businesses measure their success in part by having the right inventory available at the time the customer needs it. Efficient inventory management is particularly important when perishable food items are involved. The school startup software created at Labatt Food Service was the catalyst to over \$1 million dollar operational savings in its first year of existence. In its first 3 years of use, the system has reduced inventory investment by over \$8 million dollars while reducing out-of-stock items on orders by 50%, despite a 15% increase in sales.

Our Business

Labatt Food Service delivers to the food away from home market including restaurants, schools, hotels, military bases, hospitals, and other businesses that prepare and serve food to customers. Based in San Antonio, Texas the company carries 12,000 items and ships to over 7,000 customers in Texas, Oklahoma and New Mexico out of five distribution centers. The privately held business has grown from 8 million in sales in 1980, reaching nearly \$1 billion in sales annually, currently 10th in size in food service distribution in the US.

The School Segment

One of the largest customer segments is schools. Labatt distributes to 2,800 different school locations across Texas. School start in the fall presents a special inventory management challenge. Each August the number of cases Labatt ships to customers will double when opening orders are delivered to the many hundred school campuses. All opening schools' orders are shipped in the same two week time period, and all these orders come after two to three months of inactivity. Forecasting how much will be ordered by schools in time to buy and receive the product from the manufacturer became an increasingly difficult problem to manage as the overall volume of cases to the school segment increased each year. The effect was an insufficient service level to *all* customers during this period, as measured by the number of out-of-stocks (cases ordered less cases shipped). This deficiency would persist for five weeks until the Labatt warehouses could "catch up" with the appropriate level of inventory needed to support all its customer's order demand. When we introduced the new system, out-of-stocks dropped 47% in the first year of use.

An additional complicating factor is the school bidding process, which introduces many new items and changes each school year. School contracts are awarded on an annual basis. Each spring Labatt and other distributors compete in an annual bidding process to secure the food distribution business for

schools. As many as 200 new food items will be required on each bid. Some of the items are new to the school; some are replacements to current items being shipped. The new items ship as part of the opening orders for the new fall semester, which is already a difficult time to forecast, as already discussed.

The timing presents one final complication. The bidding process for the new fall school year takes place in April, while the current year's bid ends in May, and many schools close their food service operation completely for summer until August. The awards to the distributor are made in June and July, and the opening orders for the new school year ship in August. So the time-window is very short for collecting information needed to forecast and take action.

The Solution

The breakthrough *business idea* for improving the process was simple: to secure an opening order from each customer prior to the end of the current school year in May. With this pending order, new software could be built that could identify item differences when comparing the new item bid catalog for the school (completed in summer) to the customer's opening order (obtained in May). These item differences (called "exceptions"), could be categorized so that the type of exception would determine specific actions the sales force should take to provide refined forecasting and item intelligence information – the information used to insure that the right inventory is in place in August once the school food service personnel arrive and begin to prepare their operations for feeding the kids.

This project got started with some genuine *hard deadlines*. By the time the concept was conceived and agreement was reached to move forward it was April, 2009. This left less than 2 months to secure opening orders from 2800 school campuses in 580 school districts represented by 72 Labatt sales representatives. A *people process* was started immediately to go collect and enter the opening orders into the system. Meanwhile the development team began working on a web application to compare actual orders received to the total number of orders expected. This application was crucial, because the business process depended on making sure that every school placed an appropriate order, and this was not feasible without some form of automated tracking and task generating application for the sales force.

Demand Group #	Demand Group Name	Exceptions			Opening Order % Received	No Orders Expected	All Opening Orders Entered
		Total	Answered	Pending			
64099	COPPERAS COVE ISD	<i>Bid Not Processed</i>			53.0%	<input type="checkbox"/>	<input type="checkbox"/>
21201	BELTON ISD	<i>Bid Not Processed</i>			95.0%	<input type="checkbox"/>	<input type="checkbox"/>
41560	SMITHVILLE ISD	<i>Bid Not Processed</i>			0.0%	<input type="checkbox"/>	<input type="checkbox"/>
63033	SALADO ISD	<i>Bid Not Processed</i>			50.0%	<input type="checkbox"/>	<input type="checkbox"/>
66001	LEANDER ISD	<i>Bid Not Processed</i>			91.0%	<input type="checkbox"/>	<input type="checkbox"/>
45801	GEORGETOWN ISD	<i>Bid Not Processed</i>			25.0%	<input type="checkbox"/>	<input type="checkbox"/>
John Gallimore Totals					52.3%		

Click Here for District Detail

Check Here When No Orders Are Expected or All Orders Are In

Copperas Cove ISD

Opening Orders received for 8 of 15 Campuses

Customer #	Customer Name	Total Orders	Total Cases	View
368202	COPPERAS COVE ISD-S.C. LEE JUNIOR H.S.	3	339	<input type="button" value="View"/>
368199	COPPERAS COVE ISD-JUNIOR HIGH SCHOOL	3	223	<input type="button" value="View"/>
368210	COPPERAS COVE ISD-C.R. CLEMENTS INTERM.	2	293	<input type="button" value="View"/>
368245	COPPERAS COVE ISD-HETTIE HALSTEAD ELEM.	2	316	<input type="button" value="View"/>
368237	COPPERAS COVE ISD-FAIRVIEW ELEMENTARY	1	45	<input type="button" value="View"/>
368180	COPPERAS COVE ISD-HIGH SCHOOL NUTRITION	1	85	<input type="button" value="View"/>
278513	COPPERAS COVE ISD-WAREHOUSE	1	123	<input type="button" value="View"/>
368229	COPPERAS COVE ISD-LOVETT LEDGER INTERM.	1	89	<input type="button" value="View"/>
368695	COPPERAS COVE ISD-HIGHSCHOOL-SNACK BAR	0	0	<input type="button" value="View"/>
368288	COPPERAS COVE ISD-MAE STEVENS ELEMENTARY	0	0	<input type="button" value="View"/>
368261	COPPERAS COVE ISD-MISS JEWELL ELEMENTARY	0	0	<input type="button" value="View"/>
368318	COPPERAS COVE ISD-J.L. WILLIAMS ELEM.	0	0	<input type="button" value="View"/>
368253	COPPERAS COVE ISD-HOLLIE PARSONS ELEM.	0	0	<input type="button" value="View"/>
368296	COPPERAS COVE ISD-MARTIN WALKER ELEMEN.	0	0	<input type="button" value="View"/>
368326	COPPERAS COVE ISD-H.S. NUTRITION DEPT.	0	0	<input type="button" value="View"/>
Copperas Cove ISD Totals		14	1,513	

Click here for order detail

The Initial DDD Model

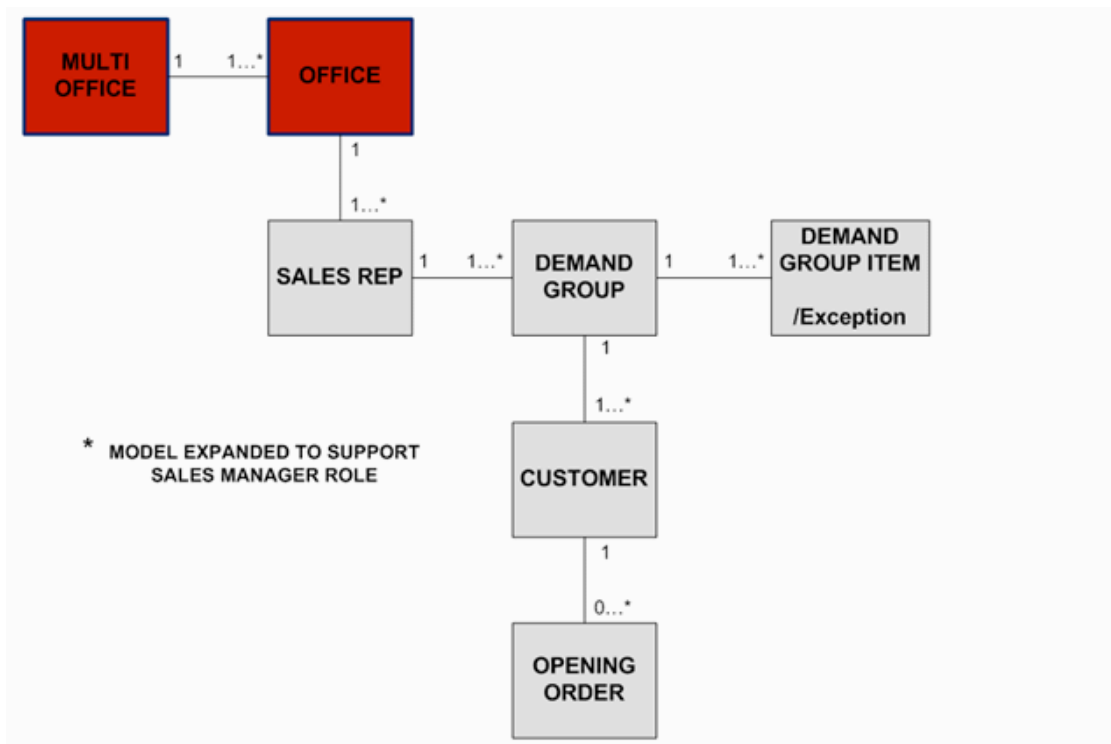
The first step was to come up with a model that could express which customers had ordered, which had not, and who within our sales organization was responsible for each. Each customer has one sales rep, but this is an oversimplification. Customers have hierarchy and compositional structures, and buying and negotiations happen at different levels. For examples, school districts may negotiate for their individual

schools. Customers may group together to form a larger entity (Coop) that can work out better deals for its members.

Likewise, our own company has regional offices and our sales organization has a hierarchy where senior sales managers come into play in certain circumstances. A school located in Houston has a local Houston rep managed by a Houston sales manager, but the person responsible for the Coop might reside in San Antonio. This obviously complicates the accountability and reporting needs of the system.

The team took three quick iterations of the DDD modeling process, brainstorming models, refining them, and trying them against concrete scenarios, to get an initial model we wanted to build on. This model made explicit several new concepts which had previously been implicit or fuzzy.

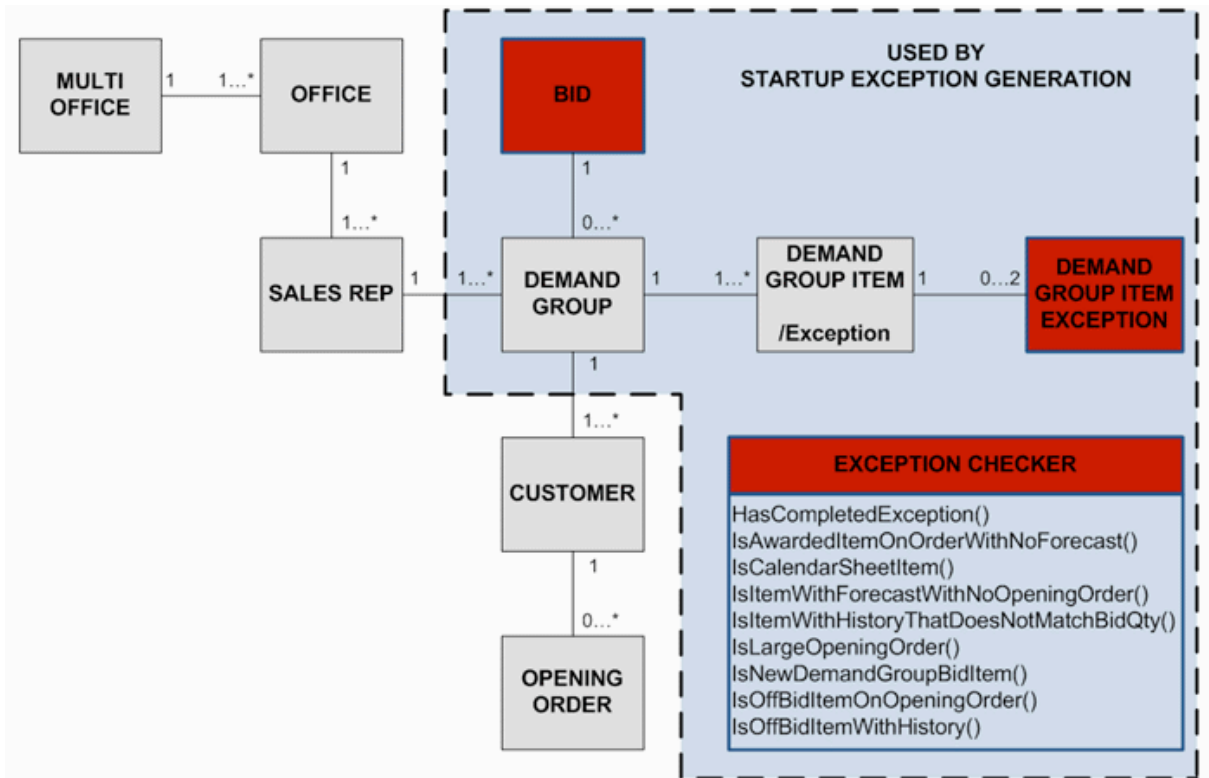
The initial model was then used to build the application to account for all the opening orders as previously discussed (see above).



Modeling “Exceptions”

As Labatt received bid award notifications from the customer, the opening orders could now be compared to the new bid for the fall semester. With this in place, the team engaged in more modeling sessions, and the original domain model underwent a few dramatic shifts during this phase of the project. Particularly important, the concept of “Exceptions” began to emerge. Exceptions can be thought of as tasks or actions that the sales rep has to take with the customer to obtain additional information.

Two categories of exceptions emerged. The first category involved actions that clarified to which item the customer intended to buy. For example, if a bid specified a new type of green bean, but the school had been purchasing the old green bean at the close of the previous semester, the rep had to explicitly identify which of the two the customer would purchase for the new school year. The second category of exceptions dealt with the amount of an item that the customer intended to buy and the frequency with which they would order. There are several specific types of exceptions in the new system, fleshing out the two broad concepts.



Exception Reporting Application

At this point, web views of the summary and detail exceptions were built. This piece of the system was completed in July, even as bids were being awarded to Labatt. The sales reps now had the tool they needed to meet with the school customers and manage forecasted demand via a clear and concise set of exceptions.

Demand Group Name	Exceptions		
	Total	Answered	Pending
COPPERAS COVE ISD	25	0	25
BELTON ISD	31	5	26
SMITHVILLE ISD	75	26	49
SALADO ISD	67	50	17
LEANDER ISD	101	59	42
GEORGETOWN ISD	93	57	36
S	392	197	195

Click Here
for Exception
Task Queue

Harlandale ISD

* Discontinued items highlighted in red

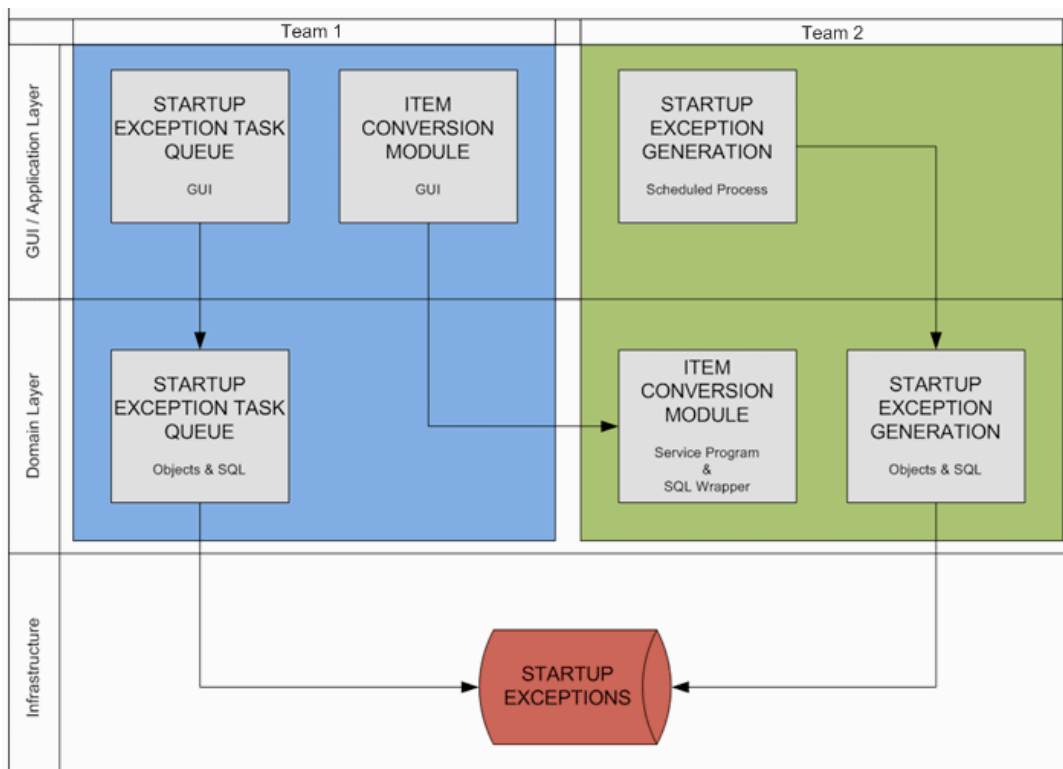
View: All Exceptions Filter:



Exception	Item #	Pack / Size	Label	Description	Awarded On The Bid?	Hist Fall	AWM Spr	Forecasted AWM	Opening Order Qty	Tools	Done
Off Bid Item On Opening Order	8906901	96/4.97 OZ	Tony's	Pizza, Pepper,/100% Mozz Wdg	No	72	72	72	188		<input type="checkbox"/>
Off Bid Item On Opening Order	6719456	6000/12 X 13	North Rivr	Napkin Disp Serv-Rite Mini	No	0	0	0	13		<input type="checkbox"/>
Off Bid Item On Opening Order	3777904	104/0.875 OZ	Cheetos	Baked Cheetos Flamin Hot	No	60	60	60	110		<input type="checkbox"/>
Off Bid Item On Opening Order	1271303	24/12 OZ	Hawaiinpnc	Fruit Punch	No	46	46	46	134		<input type="checkbox"/>
Off Bid Item On Opening Order	3736535	300/2 PK	Mjm	Bear Grahams Apple Cinnamon	No	24	24	24	37		<input type="checkbox"/>
Off Bid Item On Opening Order	3735101	300/9 OZ	Pepperidge	Grahams, Giant Goldfish	No	21	21	21	54		<input type="checkbox"/>
Off Bid Item On Opening Order	2280008	6/#10	Red Gold	Ketchup,Fancy 33%	No	18	18	18	37		<input type="checkbox"/>
Off Bid Item On Opening Order	3777018	8/16 OZ	Fritos	Chips, Corn Bulk	No	17	17	17	9		<input type="checkbox"/>
Off Bid Item On Opening Order	3778028	104/75 OZ	Funyuns	Snacks, Onion	No	17	17	17	38		<input type="checkbox"/>
Off Bid Item On Opening Order	3478903	60/1.5 OZ	Ken's	Dressing, Ranch Fat Free	No	16	16	16	6		<input type="checkbox"/>
Off Bid Item On Opening Order	2280010	1000/9GM	Red Gold	Ketchup,Fancy 33% Pc	No	14	14	14	30		<input type="checkbox"/>
Off Bid Item On Opening Order	6838502	6/500 CT	Reynolds	Potato Wrap Plain 9X10-3/4	No	11	11	11	43		<input type="checkbox"/>
Off Bid Item On Opening Order	7145551	1/1000 CT	Papercraft	Pan Liner, 16 3/8 X 24	No	11	11	11	40		<input type="checkbox"/>
Off Bid Item On Opening Order	3732122	60/1.5 OZ	Sunshine	Crackers, Cheez-It Reducdfat	No	9	9	9	40		<input type="checkbox"/>

Model Clarity Enabled Deployment of Additional Programming Resources

One of the advantages to a clear domain model was realized in late July when a second development team was deployed to help meet the August deadline. While one team was working on the exception task queue GUI, the new team worked to apply the core business logic for the exception types to the underlying data tables in the system. The model was used to delineate responsibilities between the two development teams.



Item Conversion Module

One of the key components being developed during this phase was the item conversion module. Many of the exceptions involve replacing a food item used in the previous year with a new item from the new bid. The sales rep works with the customer to identify the new item, and then all the opening orders for every customer within that school district have to be changed to reflect the new item. The purchasing system also needs new forecast information. The item conversion module coordinates this process, making sure the GUI team consumes the module by passing in all the relevant item and customer information. The second team updates the data infrastructure layer. Both teams were able to coexist and adjust the integrations quickly due to a clear understanding of the roles and the loose coupling of the modules. All this was enabled by the DDD modeling process.

The screenshot shows a 'Convert Item' window with the following data:

Current Item:			
Item #	Pack/Size	Label	Description
3240033	1000/9 GM	HUNT'S	KETCHUP P/C

Convert To Item:			
Item #	Pack/Size	Label	Description
3249257	1/1000 CT	HEINZ	KETCHUP, PACKETS 9 GRAM SSK

Current Conversion Factor: 1

Please review the following information, uncheck demand groups/orders you do not want converted

Customer	Show Order Detail	Convert Demand Group?
Copperas Cove ISD	▼	<input checked="" type="checkbox"/>
Forecast On Current Item: <input type="text" value="25"/> Forecast On Convert To Item: <input type="text" value="0"/>		
Total Orders: 3 Total Old Qty: 72 Total New Qty: 72		

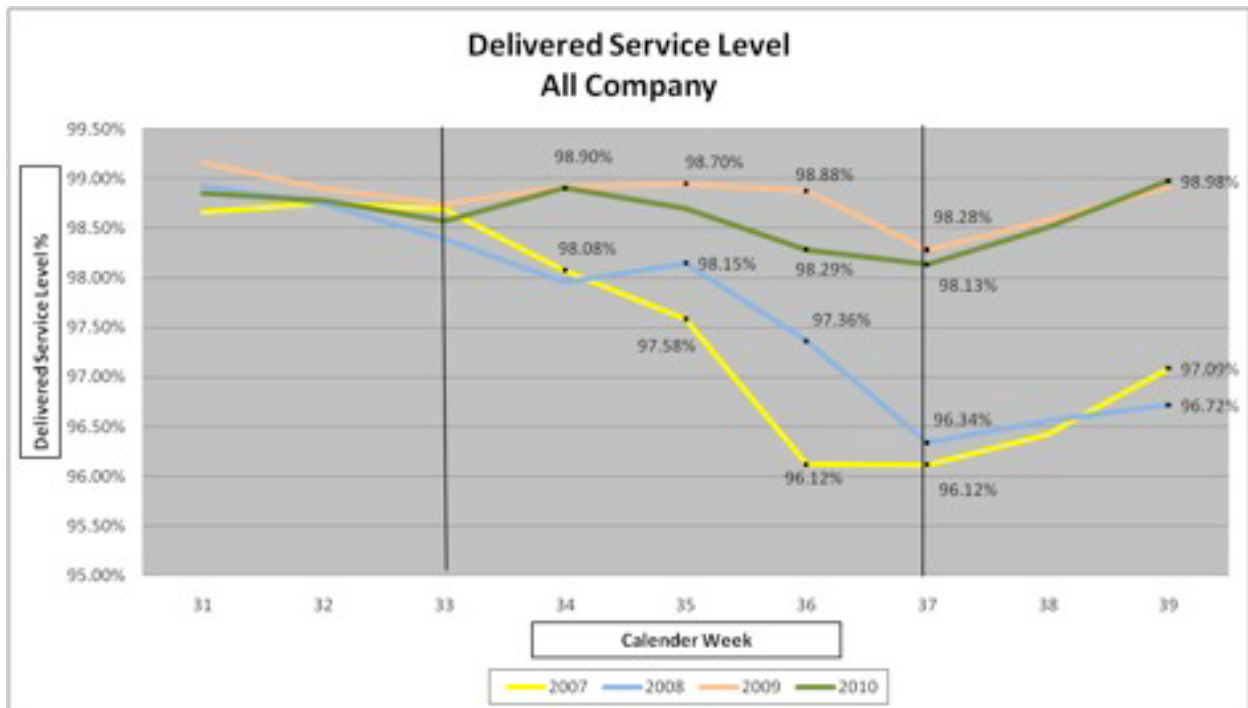
Customer	Show Order Detail	Convert Demand Group?
Lake Mansfield ISD	▼	<input checked="" type="checkbox"/>
Forecast On Current Item: <input type="text" value="33"/> Forecast On Convert To Item: <input type="text" value="0"/>		
Total Orders: 3 Total Old Qty: 72 Total New Qty: 72		

Buttons: Return (with left arrow), Commit (with floppy disk icon)

The Impact

The impact to the company's performance and service level over the past two years from this system has been dramatic. Out of stocks to customers during the first five weeks of 2009 decreased by 49,000 cases, despite a 220,000 increase in overall case volume shipped. The calculated financial impact was over a million dollar savings. Additionally, the company reduced the startup inventory needed to fill opening orders by more than \$4 million dollars. The sales team responded to over 200,000 individual exceptions across the state. A similar performance was realized in 2010 including an overall reduction in startup inventory of another \$4 million dollars.

The chart below shows how the persistent plunge in service level in weeks 34-39 was reduced to a minor dip after the introduction of the new software.



Several enhancements to the system were made in year two to expedite the exception responses for the sales force. These changes were designed and executed quickly with no major underlying reconstruction to the model, a further testimony to a quality design and a great process. The sales force also thoroughly embraced the new system, in spite of the fact that it adds work for them. They see the results.

Sales Representatives Appreciate the New System

A survey of the school startup task queue system by sales reps in Houston offered some great testimonials about the system:

Jason Beinart: “Overall the key benefit is that it forces sales reps to work with schools at the district level 1st and then 2nd at the item level...It allows for more accountability on both parties to be on the same page”.

David Laborde: “One school was difficult because they were new and almost every item was an exception...a lot of these items were large movers...with the system making an exception and pointing them out, I was able to add them on the bid...It made us more prepared and they had a higher fill rate, very smooth start and a very satisfied customer with the transition”.

Adam Robeau: “ The task queue is good for me in that it really helps me keep the opening orders organized and to make sure I have the correct items loaded for my schools. I am able to really use the

system to 'live each line item' with my schools to understand what they are going to use the upcoming year".

Ashley Allshouse: "This system really helped me as a first time rep, starting school for our largest school customer, deliver seamless service and have a high service level even with my inexperience".

A Week Like Any Other

The first week of the school year is now like every other week of distribution at Labatt, with the company delivering a very high service level with minimal errors to all its customers. The school segment continues to grow, and Labatt has built a system integrating business process and software that facilitates a large number of Labatt employees and its customers working together in a proactive manner to get food items to the school cafeterias each fall. The project was developed and implemented by two development teams in less than five months using the new tools and techniques. The DDD process with lean development principles insured that only the needed software was written, and that it was designed in such a way as to make it easy to interface to other existing Labatt software systems. The DDD process is a permanent, key component process to all development at Labatt.