

A scheduling and Capable-to-promise Application for Swift and Company

OVERVIEW

Swift and Company is mainly a protein processing business which is located in Greeley, Colorado. Swift and Company is a privately held company. It has 3 business segments and they are Swift, Beef, Swift pork and Swift Australia. The annual income of the company is over 8 billion. Beef and related products are sold in large amounts by the company. Swift and Company uses 45 Linear programming models relating the three formulations. It shows how beef-fabrication operations happen at 5 plants whenever orders are received. Documentation of order fulfillment, ontime delivery had to be shown. Swift and Company has slaughter and processing operations. The five plants are located at Colorado, Texas, Nebraska and Idaho. Out of these five plants, three of the plants process fat cattle. The animals which are 2 years old which have been fattened are fed for almost 90 to 120 days before being slaughtered. The lean cattle which is considered to be older animals, such as bulls, or dairy cows are not fattened before being slaughtered. Each of the plants has the capacity to process 2500 heads of cattle. The total cattle being slaughtered ranges from 18,000 to 25,000 approximately. The most important product of Swift and Company is the boxed beef.

APPLICATIONS

1. **THE SCHEDULING MODELS**-This is one of the main applications. This is an LP model which gives out a shift level schedule for each plant. Swift makes use of these models to produce a schedule for the next shift. It also creates a projection of short orders. The disintegration trees are divided into 3 types of production operations. The 3 operations are cutting operations, Packaging operations and Bridging operations. Cutting operations make use of only one piece of a primal or a subprimal cut and give out one or more subprimal cuts. Packaging operations consider wrapping and boxing of finished good products. Bridging operations allow downward substitutions according to brand and grade at various levels of the disintegration process. One of the most popular products sold at Swift and Company is the boxed beef. It is one of the fresh products available. Frozen products are also in great demand. The company stocks fresh inventory inside the plants. Frozen inventory is also stored at various locations. When both the inventory is combined it yields a combination of each primal which also has a large no of finished product codes. As we all know each model is assigned a time period and as the time period moves forward the age of inventory also increases. As a result, this leads to proliferation of inventory variables which in turn leads to model size exceeding the memory allotted for each server. We can limit the potential model size by using telescoping time buckets in the scheduling application.

2. **THE CAPABLE-TO-PROMISE MODEL**-They are also called as CPT models. The function of the model is to determine if a plant can ship a requested quantity of order-line-item or not for a particular date and time. Whenever a query is entered the system updates the transaction information to the needed model, modifying the existing LP to add some new information to it, and solves it, returns an answer to the order entry system. To get the correct response time, we had to develop a separate group of models which can handle the CPT functions in the applications. When you consider the ground beef CPT models, the restrictions which are applied to the integer and semiconductor variables are relaxed. This in turn reduced the solution times. After each refresh cycle, we take the CPT models off line, restart them again by keeping the correct information in hand. The information must consist of customer orders, finished

goods inventory and cattle availability. This application has 4 types of transactions. They are 1. Queries are asked to know whether a certain quantity of a product is available or not for a particular date. 2. Product commitment to whenever quantity is available for that particular date. 3. Delete the order line items that already exist and unfulfilled demand variable has to be fixed for that line item. This avoids removal of rows. 4. Query mode or commit mode can be used to edit existing order line item quantity. AspenTech uses 4 techniques to improve Application's performance and they are 1. Separating starting inventory from production 2. Restricting the generation of unnecessary variables and constraints 3. Model Robustness 4. Basis management

3. THE AVAILABLE-TO-PROMISE MODEL-They are also called as ATP models. Since ATP models are scheduled for a particular time, for every 15 minutes these models extract inventory, and their orders. They produce schedule from their counterparts for each plant. They further get processed. Since they have the entire schedule fixed, the model calculates the products which were unsold from each shift after maximizing the quantities of fresh and frozen products. Some products have greater demand than the others. The plants must process the entire animal in one shift and this stocks up the unsold inventory.

BENEFITS

1. The 2 companies Aspen Technology, Swift and Company did a post implementation audit of benefits for about 20 months by putting the system into operation. The important key metrics were identified for business operations. The historical data was analyzed for 3 years. When data became unavailable, had to gather anecdotal evidence by conducting interviews to the stakeholders. The employees in operations and scheduling, sales, pricing, warehousing, logistics and information technology were also interviewed. The shipment history was analysed from June 2001 to August 2003. 1,15,000 records were being compared from the previous project Phoenix. After being compared there was an improvement in on-time performance. The improvement showed only during summer, because the company was seasonal.

2. The percentage of orders which were shipped on time and the orders that were shipped in one day's time increased from 65% to 87%. The deliveries which took more than 2 days dropped from 10% to 7%. Later this further dropped to 6%. There were improvements in every season.

3. Sales team focussed more on selling the current week's production to the customer. Customers waited till the weekend to place orders so that they can take advantage of the large range of discounts they get. Because of these discounts Swift and Company's profits were affected. When excess inventories were refrigerated they had to pay excess rent for refrigeration of these products.

4. This application gives permission to schedule and produce the products its customer actually wants. To make more profit Swift and Company gives less number of discounts. Products which have less demand are produced in less quantity and therefore temporary storage and its costs are reduced by 90%.

5. The average competitive position of the company got improved and there is an increase in the business complexity in the marketplace. Audits were conducted and the total profit was about \$12.74 million which can be further broken down as optimized product mix-\$12,000,000 order lost because of system problems-\$20,000 reduction in price discounting-\$56,000 and reduction because of lost customers-\$160,000

