



THE COMPUTERWORLD HONORS PROGRAM

CASE STUDY

LOCATION:
*Greensboro, North Carolina,
United States*

YEAR:
2006

STATUS:
Laureate

CATEGORY:
Manufacturing

NOMINATING COMPANY:
i2 Technologies

ORGANIZATION:

VF Corporation

PROJECT NAME:

Pushing the VF Supply Chain to the Edge

Summary

Competing in a global marketplace with a truly global supply chain presents constant challenges for VF Corporation. VF sources finished products from the Far East and Central America, manufactures in VF's owned factories and also uses other manufacturers operating under contract. In addition to the complexities of globalization VF is challenged with the pressures of meeting ever higher service-level agreements for its customers and managing VF inventory for customers like Wal-Mart while integrating its diverse business acquisitions. To meet the requirements of this ever changing business environment VF is incorporating increasingly sophisticated tools for forecasting, planning, tracking and replenishment systems.

As the evolution continues, VF's most recent implementation of a new business release of i2 Supply Chain Planner was for its intimate apparel coalition. The business required that manufacturing capacity as well as material availability, with multiple levels of material substitution and the ability to share materials between manufacturing locations, be considered. For example, if a prime material is not available at the primary cut location then a search is performed for the prime material at other cut and sew locations in priority sequence, if the prime material is not located at any location, then a new level of searching begins with a first priority alternate material then second alternate, etc., always within the constraint of manufacturing capacity and satisfying the requirements of the order due dates.

Some of the specific goals were to:

- Improve asset utilization for the owned factories
- Improve the quality of raw-material as well as finished goods inventory
- Improve customer service fill rates
- Increase flexibility in utilizing sourcing options
- React quickly to demand and supply changes by planning daily



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Introductory Overview

One of VF's most recent new business releases of Supply Chain Planner, for VF Intimates, was designed to consider both manufacturing capacity and raw material availability constraints. In order to support the business goals as well as improving processing efficiency, the Intimates supply chain was split into a manufacturing and a purchasing model, with the resulting plans from each model merged for input to VF's ERP system. The business requires a longer planning horizon for sourced manufacturing to allow for longer lead times incurred with manufacturing in the Far East. Additionally, the manufacturing model supports the goal of providing the flexibility to plan by allowing the sharing of raw materials across cutting and sewing facilities, which supports the goal of reducing raw materials inventory and the associated carrying costs.

The Intimates supply chain consists of 43,000 SKUs, which may each contain up to 60 component materials of which approximately 50 percent may be constrained. In addition VF Intimates plans using alternate materials and constrains the plan based on those inventories while allowing sharing of materials between cutting and manufacturing facilities. The complexity of the Intimates supply chain results in an i2 model that consumes 27 Gigabytes of memory and is processed in 3 hours.

The Intimates implementation was designed to process the entire bill of materials for each SKU, taking the place of VF's more traditional MRP system. This was done due to i2's ability to model and prioritize the alternate materials by location, a function that could not be duplicated in the MRP package. By utilizing i2 SCP for the MRP function, VF was able to ultimately create executable production orders and purchase orders based on the material availability by location. By creating a loop of feeding bills-of-material, capacity, inventory and work-in-process from the ERP to SCP, planning daily using the latest view of demand, and feeding planned production and purchases back to the ERP, the planners see accurate, up-to-date plans every day, providing an opportunity to quickly respond to changes in demand, capacity, or availability of materials. With the longer lead times of a global supply chain, we strive to take advantage of all opportunities for optimizing our supply chain.

In addition to making optimum use of materials and covering demand, the model also ensures that VF keeps the sewing lines busy by filling available capacity. This offers the additional benefit of assisting VF in maintaining a stable workforce of trained cutting and sewing operators.

Some measures of the Intimates supply chain models are:

	Purchase Model	Manufacturing Model
Plan horizon	77 Weeks	42 Weeks
Capacity	Weekly	Weekly
Demand Horizon	77 Weeks	74 Weeks
End Item SKUs	15,773	17,826
Ram MaterialCs	1 Unconstrained	40,248
Buffers	15,773	58,074
Operations	92,945	159,260
WIP	27,086	41,117
Requests	456,505	359,438
Bills of Material	18,652	28,390
Plants	1	28

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Benefits

VF has derived value from reducing the planning cycle time by 75%, increasing customer service levels, and reducing obsolescence. During a period where VF has recognized both top-line and bottom-line growth, we have been able to reduce inventory levels while improving on-time shipping performance.

Value derived from SCP:

- Reduced inventory by tens of millions of dollars
- Reduced planning cycle times by 75%
- Increased customer service levels by approximately 15%
- Increased revenue based on improved inventory quality
- Quicker response time to changes in demand
- Enhanced production plans that are feasible and executable
- VF Intimates performs complete MRP in i2 SCP, providing accurate material substitution information to the purchasing and manufacturing execution systems

The Importance of Technology

The VF Intimates supply chain planning implementation provides VF with an up-to-date view of a truly demand-driven supply chain which allows VF to quickly identify potential problems in the supply chain and to quickly react to changes in product demand. With over 900,000 possible combinations of manufacturing location, material location and material substitutions there is no way a human could solve all the business situations presented by ever changing customer demand, realignment of sewing capacity and raw material availability. Without the i2 SCP tool the production plans would be less accurate, raw material inventory would go back up and order fill rates would go down.

With much of the production now based in the Far East, and with associated longer product lead times and a procurement office in a time zone that is twelve hours away, it is essential that we provide the best plans possible. The accuracy of inventories and the ability to respond to the most up-to-date demand are critical to the success of VF's global supply chain.

Originality

The common systems strategy at VF focused on the delivery of business solutions rather than implementation of specific software. A solution would typically consist of an ERP package, supply chain planning solution and reporting solution. Due to the complexity of a combined rollout, implementation times have ranged anywhere from 3 months to 2 years. As implementation partners, i2 and VF have worked together in developing enhancements to the i2 suite of products, rather than simply implementing an 'out of the box' software package.

When VF began the common systems initiative, we selected best-of-breed software and we feel that the products that we selected are good. However, i2 like most software companies was not in the apparel manufacturing space. VF and i2 established a very productive partnership result-



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ing in the development of a very robust tool for this business, the Material and Asset Planning template. Over the years VF and i2 have continued to collaborate on the enhancement of this solver yielding a tool set that contains both the functionality and flexibility that VF requires. Each VF implementation of i2 SCP results in a better solution and faster realization of benefits.

Each i2 SCP model is tailored to the need of the business division resulting in an overall solution where no two of the models are alike.

Success

While it takes some time to earn both the acceptance of the tool and the trust of the business users, VF began to recognize value in more accurate plans and better inventory within months of each of the initial implementations of the i2 Supply Chain Planning solution. Business release upgrades have yielded further improved efficiencies in utilization of resources and quality of inventory.

As stated above the success of the project was judged by the reduction of both finished and raw material inventory, reduction of cycle time and on time customer fill rate.

Difficulty

VF Corporation has the two largest and most complex i2 SCP models in the world, and the Intimates supply chain model is one of those. For example, a bra has an average of 44 raw materials in the bill of material with each raw material having an average of 3 substitute materials and each raw material may be at one of multiple locations. In addition there may be sub-assemblies involved in the construction of the finished product which must also be planned. In this project VF undertook the challenge of not only optimizing sewing capacity and satisfying customer demand on time, but it also included the complete MRP explosion of all the raw materials, including the substitute materials and sub-assemblies. The i2 SCP project succeeded in consistently delivering an executable plan supported by raw a material procurement plan.

One of the more significant challenges was the requirement to run this engine in a nightly batch window. From the start of the data feeds to the engine to the export of the planning and procurement answers the entire process currently runs in approximately 3 hours. With the data volumes and complexity of the planning rules this is a very unique accomplishment in an apparel manufacturing environment.