Streamlining the Supply Chain: Fonterra's Use of LogicNet Plus

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Introduction to Fonterra

New Zealand's Fonterra Co-operative Group is the world's leading exporter of dairy products and is responsible for more than a third of the international dairy trade. Fonterra is New Zealand's largest company, accounting for 20 percent of the country's exports and 7 percent of its GDP.

Fonterra was established in October 2001 through a merger of the two largest New Zealand dairy cooperatives and the New Zealand Dairy Board. The purpose of the merger was to create a single company to manage a supply chain that stretches from farms all over New Zealand to customers and consumers in more than 140 countries.

Fonterra has an annual turnover of U.S.$10.7 billion. Its core business consists of exporting dairy products globally—95 percent of its New Zealand production is exported. It also operates a fast-moving consumer goods business for dairy products, Fonterra Brands, which has a strong presence in Asia and Australia.

This white paper provides a case study on how Fonterra has utilized IBM® ILOG LogicNet Plus software to create efficiencies and streamline its supply chain. The case study illustrates a network redesign project and its results.

Fonterra's Supply Chain and Challenges

It all starts at the farm with Fonterra's 11,000 farmer shareholders supplying up to 14 billion liters of milk each year (not including any milk procured outside of New Zealand). This milk is transformed, through a

global manufacturing base, into 2.5 million metric tons of product for sale, including milk powder, cheese, yogurt, liquid milk and nutritionals. This product is then sent throughout the world to markets in the United States, South America, Mexico, Europe, the Middle East, Asia and Australia.

Fonterra is faced with a multi-echelon supply chain that spans multiple countries, extended transit times, limited shelf life and seasonal production —all factors that make this a challenging supply chain to manage.

How LogicNet Plus is utilized

Fonterra is a frequent user of LogicNet Plus, a network design and planning solution, which has enabled the company to challenge current thinking in supply chain management and also identify significant opportunities for taking cost out of the supply chain.

LogicNet Plus is able to handle the complexity of the Fonterra supply chain. It provides Fonterra with a holistic view of their supply chain, and also serves as a tool for long-range strategic supply chain planning decisions.

Applications Fonterra has used LogicNet Plus in include:

- Redesign of the network
- New warehouse development projects (Where should warehouses be located? How big should they be? What mix of products should be stored at each site?)
- Reducing the reliance on third-party storage providers

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- Integration of supplier and customer supply chains into the model to further increase the potential for global cost savings

- Analysis of supply chain risks

- Assessing the carbon impact of any supply chain recommendations

Fonterra's baseline global supply chain model, which manages over 535 million parameters, takes about 10 hours to run. However, individual projects use only the relevant portions of this model. This brings model running time down to anywhere between two minutes and half an hour. These smaller models are usually based on a specific country of interest; for example, warehousing decisions in North America, network optimization in Asia and site selection in South America.

Fonterra differs from other LogicNet Plus users in that it utilizes the tool on an ongoing project basis, rather than as a one-time network optimization tool. The supply chain development team at Fonterra is seen as a group of consultants that works on a variety of projects with both internal and external customers. Most projects are focused on long-term strategic decision making, as time frames are usually between two to five years.

Supply Chain Streamlining Case Study

The first project that utilized the IBM ILOG supply chain optimization software was a review of Fonterra's warehousing strategy, or more specifically, the development of a "super-hub" in New Zealand. At the outset of this project, Fonterra had, in the North Island of New Zealand, 47 warehouses for refrigerated product that amounted to a significant annual operational expense. (See *Appendix 1* for a description of the resulting "coolstore" super-hub in New Zealand.)
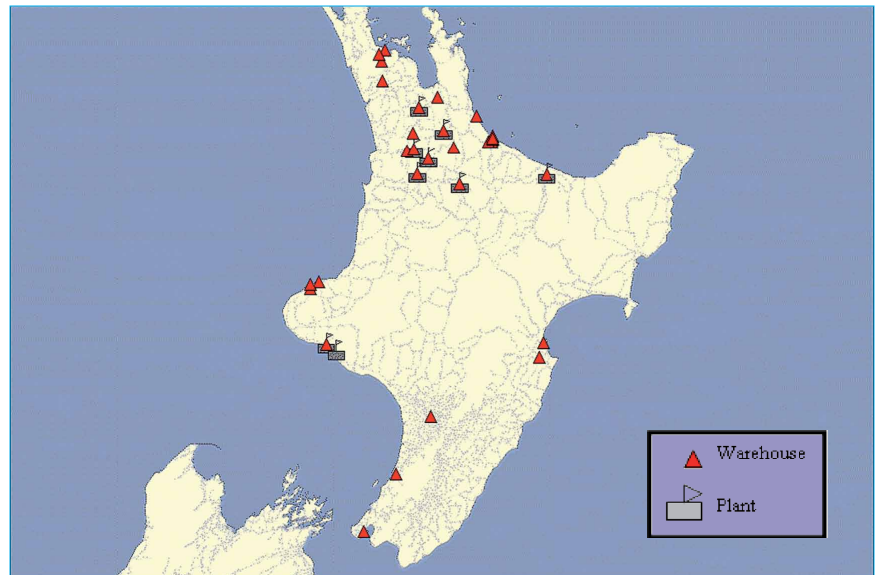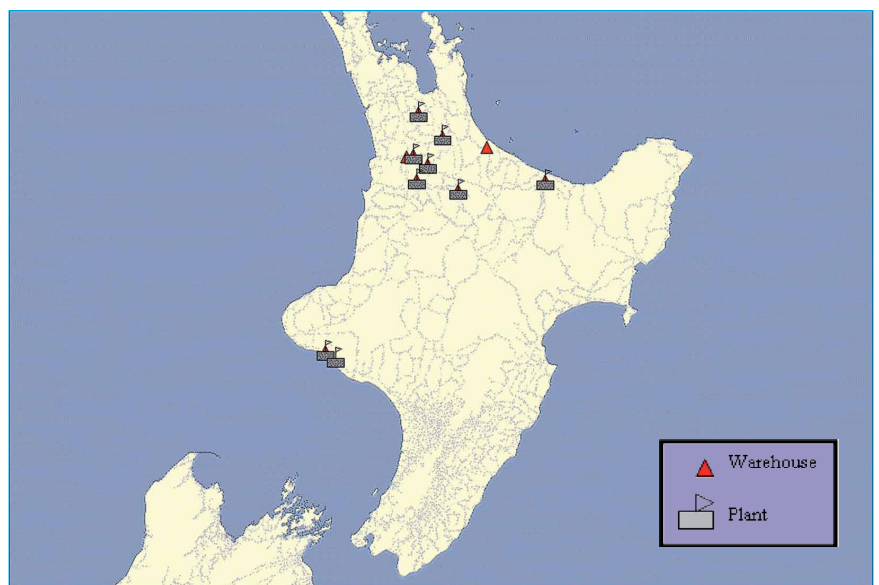
Figure 1: Fonterra's North Island Refrigerated warehouse network (beginning of project)

Using LogicNet Plus, Fonterra was able to optimize the network and make the following recommendations:

- Size of the potential hub

- Location

- Products stored at the hub

- Which current warehouses should be closed/exited

- Transportation options

In addition to these recommendations, Fonterra was able to determine, through inputting relevant cost data, the savings associated with each of these recommendations. Out of this analysis, the network was simplified and significant savings determined.

Figure 2: Fonterra's North Island Refrigerated warehouse network (post optimization)

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Highlights

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The following benefits were quantified as direct cost savings due to the model's optimal recommendations:

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- Reduced movement of product between plant and off-site stores
- Network cost savings from removing 4,000 truckloads off the road annually
- Potential to exit around 12 third-party warehouses

In addition, Fonterra experienced the following intangible benefits:

- Operational efficiency gains as a result of consolidating to a single location, i.e. access to more vessels
- Greater reliability of supply
- Integrity of product temperature

A significant benefit to Fonterra was the ability to reduce its carbon footprint—an analysis made possible through the use of LogicNet Plus.

A significant benefit to Fonterra was the ability to reduce its carbon footprint—an analysis made possible through the use of LogicNet Plus. Carbon footprint is a key concept for Fonterra. It can be defined as a measure of the impact certain activities have on the environment in terms of the amount of greenhouse gases produced.

The Appendix 1 press release illustrates the positive impact this project has had on Fonterra's carbon footprint, through a reduced reliance on road transport. The lower carbon footprint predominantly came about by switching transport modes from road to rail, which led to greater fuel efficiency and reduced carbon output in terms of tons per mile.

Appendix 1: Project's Impact on Fonterra's Carbon Footprint

New milk coolstore to take 4,000 truckloads off the road
By Allan Swann, The National Business Review, Oct. 17, 2008

The coolstore is to be added to the 50,000 tonne Crawford St dry store, which was completed in August 2005, to instant success.

Crawford St offered a consolidated staging area for Fonterra's Waikato dairy operations, particularly Te Rapa and Te Awamutu, which produce 55 percent of the regions milk.

Its key advantage is the direct link to the main rail trunk line juncture, allowing easy access to the Port of Auckland (72 percent) and Port of Tauranga (20 percent), and manufacturing and storage facilities at Te Awamutu, Morrinsville, Waitoa, Hautapu, Waharoa, Lichfield and Tirau. It also services Fonterra's Te Rapa and Canpac operations.

In 2007, the facility accounted for 40 percent of KiwiRail's operations in the region, pumping out 26,771 Twenty Foot Equivalent Unit's (TEUs). Fonterra projects the company will do 30,000 TEUs this year.

Fonterra director of group manufacturing and supply chain Gary Romano says the dry store facility has also taken 45,000 truck movements per year off the road, and has achieved significant energy savings.

"And we are looking forward to extending these benefits with the new coolstore."

The new coolstore will be one of the largest in the country and will boost output further, Fonterra's logistics manager global trade Tony Smith told the Waikato Transport Summit.

It will predominantly handle chilled and frozen finished products such as cheese and butter from Fonterra's Waikato and Bay of Plenty manufacturing sites.

The new building, which exists as an extension to the existing dry store, will stretch 235m by 90m and has the capacity for 54,000 pallets across 5 rooms with temperatures varying between -10 and 13 degrees.

The new state of the art facility will feature an all-new warehouse management system, with greater automation and seven container bays.

The addition of coolstore operations to the Crawford St facility will focus means that there is less pressure on road transport for cheese maturation.

Fonterra aims to put 262,000 tonnes of cream and cheese through the facility by November 2009. It will take 4,000 truckloads off the road per annum.

The facility should be up and running by the end of 2009.

About IBM ILOG LogicNet Plus XE

IBM ILOG LogicNet Plus XE is a network design and planning solution that combines the advanced optimization technology of IBM ILOG CPLEX with an easy-to-use graphical user interface to manage the world's most complex supply chains. Training and baseline results can typically be completed within 90 days.

LogicNet Plus facilitates quick analysis of the trade-offs between service requirements and production, warehousing and transportation costs, as well as the calculation of the optimal network configuration for different cost and service objectives. A model's solutions can be viewed, compared and easily exported to tables and graphs for presentations and further analysis.

About IBM ILOG Supply Chain Applications

Leading ILOG optimization technology and LogicTools expertise and experience in supply chain management come together in this powerful suite of applications for network design, production sourcing, inventory optimization and transportation planning, in addition to production planning and scheduling. Complement your ERP systems and make better decisions faster to optimize logistics networks and transportation strategies, set safety stock levels for sales and operations planning and improve plant operations in fast-paced industries.

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