

# University of Chile

## Auction System for School Food Services



### Objective

More than 1.3 million students at 14,000 schools depend on the National School Assistance and Scholarship Board (JUNAEB) of Chile to feed them daily. For decades the agency awarded contracts – amounting to about \$180 million annually – to caterers through a complex auction system that imposed few real restrictions. It resulted in huge losses for the Chilean government, and little control over the quality of the meals served to the students. JUNAEB needed a process that selected caterers based on the regions they covered and a set of standards for food and services.

### Solution

The Industrial Engineering Department of the University of Chile has created a new auction system for JUNAEB that restricts the final bidding to those companies able to meet a set of criteria for food and service quality, and allowing large catering companies to take advantage of their size by bidding on more than one region. The auction's vetting process includes an application based on ILOG CPLEX, which sorts through the bid proposals and selects those most closely matching the criteria. According to JUNAEB, the application has been directly responsible for saving the government of Chile \$40 million a year. This is equivalent to feeding 345,000 students over the course of one year. The system has also enabled JUNAEB to greatly improve the nutritional value of the meals and the conditions under which they are served.

- **Industry:**  
*Education and government*
- **Service:**  
*Food distribution*
- **Geographic Coverage:**  
*Chile*
- **Result:**  
*\$40 million saved per year*



## Selecting the best candidates

The auction application selects the companies that meet a set of requirements for meals and services, and includes them in the bidding process. The requirements include the content and nutritional value of the meals, how many meals per day, and the system for distributing and serving them. Catering services have to submit their proposals for meeting the requirements in order to participate in the auction. Chile is divided into roughly 90 school districts, or territorial units (TUs), and the larger companies are allowed to take advantage of their size to bid on more than one region. To further ensure service quality, however, a limit is set on the number of TUs a catering company can bid on.

The University of Chile used ILOG CPLEX to model the problem, applying the criteria set by JUNAEB. The solution sorts through the proposals, selecting those most closely matching the agency's requirements. The system uses two models: a reduced one for simple problems and an extended one for more complex problems. The first model uses 500 constraints, while the second uses 23,450 constraints. A key factor in the university's selection of ILOG CPLEX is the optimizer's speed. It enables the university to achieve a processing time of two minutes or less.

## Benefits

The speed of ILOG CPLEX enables JUNAEB to quickly select the best candidates for the auctions. The new system processes contract proposals from companies throughout the country. Auctions are held for one-third of the TUs each year, with the winning contracts lasting three years. The total sum of the auctions is about \$180 million, and bids are typically submitted by 30 companies. By imposing standards, the new system has also enabled JUNAEB to improve the nutritional value of the meals served to the students, and the conditions under which they are served. The system is expected to save the Chilean government at least \$40 million a year.

## Project

The system was developed by three people in one month. It currently runs on a Pentium III computer with Windows 2000. The application won the OR for Development award at the 2002 IFORS Conference.

## About University of Chile

**The university was founded in 1738, and is one of oldest in South America. A state-owned institution, its mission is to advance technology, culture and economics in Chile. It has 25,000 full-time students and 1,300 faculty, and has distinguished itself by providing equal opportunity for higher education. Its engineering department won the Edelman Award in 1998 for developing optimization software models – some with ILOG CPLEX – for the forest industry.**

## ABOUT ILOG

ILOG's innovative enterprise-class software components and services have helped companies maximize their business agility and improve operating efficiency for over 10 years. Over 1,000 global corporations and more than 300 leading software vendors rely on ILOG's business rules, optimization and visualization technologies to achieve dramatic returns on investment, create market-defining products and services, and sharpen their competitive edge. For more details, please visit [www.ilog.com](http://www.ilog.com)

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*“Those are official numbers from the government of Chile. They save \$40 million per year [with the ILOG CPLEX-based solution]. Those numbers consist of unit price before model and post model. The savings are on the order of 25 percent.”*

**– Rafael Epstein**  
 Associate Professor  
 Industrial Engineering  
 Department  
 University of Chile



*“The only tool that gave us the performance to solve the problem was ILOG CPLEX. We were solving 700 problems, and each solution could not take more than two minutes.”*

**– Jaime Catalan**  
 Researcher  
 Industrial Engineering  
 Department  
 University of Chile



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