ILOG Solver

Optimal scheduling, dispatching and configuration



Industry leader

Constraint programming can directly represent complex operations, making it ideal for short-term decision-making. As the leading constraint-based optimization engine, ILOG Solver provides a powerful search framework for resource scheduling, dispatching and configuration problems. Its versatile modeling layer greatly reduces development and maintenance time, and its powerful algorithms scale to solve large or complex problems.

Versatile environment

Rich modeling objects in ILOG Solver realistically represent business operations. Modifying an ILOG Solver-based application is easy, as its problem model is clearly separated from its search algorithms. Optional extensions for ILOG Solver reduce development time by providing specialized objects and algorithms for activity scheduling, vehicle dispatching and product configuration. ILOG Solver can also be combined with ILOG CPLEX, the leading mathematical programming optimizer for long-term planning, to address the most demanding problems.

Powerful algorithms

The search algorithms in ILOG Solver efficiently determine solutions for such problems as factory sequencing, staff scheduling, container loading and product customization. ILOG Solver can find an optimal solution or multiple feasible solutions for the user to consider and refine. Advanced search and domain reduction algorithms enable ILOG Solver to outperform simple heuristics in tackling the most difficult challenges, enabling companies to get the most out of their valuable resources.

- Descriptive interface
- Model-algorithm separation
- **Search framework**
- Constraint propagation and domain reduction algorithms
- Parallel search for faster solution times



Changing the rules of business™

Descriptive interface

ILOG Solver provides a descriptive interface for stating the conditions for determining optimized solutions. Discrete variables represent the primary decisions in the problem, and high-level constraints represent the relationships between the variables. The constraints can be combined to match the complex relationships found in combinatorial problems. ILOG Solver also includes interval arithmetic algorithms to represent floating-point decision variables in linear and nonlinear expressions, further enabling its models to accurately reflect real-world problems. ILOG Solver works with ILOG Concert Technology, a unified set of objects for optimization modeling. With ILOG Concert Technology, ILOG Solver can be combined with ILOG CPLEX to create solutions that use constraint programming and mathematical programming technologies to solve the world's hardest optimization problems.

Model-algorithm separation

ILOG Solver maintains a clear separation between constraints and combinatorial search algorithms, making it easier to adapt optimization models as business changes. This is a major improvement over custom enumeration code, which is usually developed for a specific model formulation.

Search framework

ILOG Solver provides a rich framework for tree-search strategies. It incorporates the user's knowledge of a problem, enabling applications to find solutions far faster. For instance, initial branching on structural variables can prune large parts from the search tree. By backtracking in the tree, ILOG Solver can generate multiple solutions quickly. In addition to the basic depth-first search procedure, ILOG Solver provides node selectors that control the order or depth of the search tree. Once a feasible solution is found, the user can refine it with the included iterative improvement methods. ILOG Solver also provides metaheuristics to keep iterative improvement methods from converging on suboptimal solutions.

Constraint propagation and domain reduction algorithms

The constraint propagation and domain reduction algorithms in ILOG Solver reduce computation time dramatically by shrinking the size of the search space. Each decision variable in ILOG Solver starts with an initial domain of possible values. The domain reduction algorithms eliminate inconsistent values during the search procedure, and the constraint propagation algorithms communicate this information among the variables. By integrating these fast algorithms into the search procedure, ILOG Solver delivers far greater performance than custom heuristics such as generate-and-test methods.

Parallel search for faster solution times

By upgrading to ILOG Parallel Solver, the user can improve computational speed – without changing code. The ILOG Parallel Solver algorithms distribute the search procedure among processors, producing a near-linear speedup for the toughest optimization problems.

Ensuring your success

ILOG provides complete consulting, training and customer support for ILOG Solver. Its best practices and project methodology enable developers to create cutting-edge applications faster and with the greatest return on investment. Consultants from ILOG Professional Services work side by side with developers, while ILOG Education Services offer training with hands-on experience. ILOG Customer Support provides crucial Web resources and hot-line services that help customers get the most out of ILOG Solver.

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.

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- Hiroshi Namie Group Leader NS Solutions Corporation



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