

Game-Changing Operational Improvements Start with Comet™

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The world's most advanced software platform for delivering next-generation optimization systems to large enterprises and mid-market companies looking to maximize productivity.

Comet™ is an award-winning platform for solving complex combinatorial optimization problems in areas such as resource allocation and scheduling, and is the first commercial technology to solve online (dynamic) optimization problems under uncertainty. Comet uniquely combines techniques for Constraint Programming, Mathematical Programming, and Constraint-Based Local Search, and offers an exclusive approach to combinatorial optimization with a new, rich language for modeling and searching. Comet dramatically simplifies the design and implementation of optimization solutions, while preserving the efficiency of low-level, problem-specific implementations, enabling organizations to tackle dynamic challenges far more efficiently and effectively than previously possible.

Examples of where Comet can help include:

- Routing with changes/interruptions
- On-demand manufacturing
- Complex scheduling of people and events
- Managing the supply chain and optimizing inventory size
- Emergency evacuation and transportation challenges
- Biotechnological experiment design to speed drug discovery

Technology Overview:

- Optimization platform integrating Constraint Programming (CP), Constraint-Based Local Search (CBLS), and Mathematical Programming, including linear programming (LP) and integer programming (IP)
- Very high-level programming language: garbage-collected, object-oriented language with advanced control and data structures, and modeling abstractions
- Advanced support for parallel and distributed implementation, including threads, processes, parallel loops, distributed objects and work-stealing protocols
- Visualizer based on a declarative graphics layer and events

Key Features

Dynadec invented Comet's Constraint-Based Local Search:

- Local search on high-level optimization models
- Invariants and differential invariants for incremental computations
- Rich constraint and objective language, including arithmetic, logical, and global/combinatorial constraints
- Ability to model soft constraints and preferences
- Support for meta-heuristics, including tabu-search, simulated annealing, variable-depth neighborhood search, guided local search, and hybrid evolutionary algorithms

Comet takes Constraint Programming to a new level with the following capabilities:

- Arithmetic, logical meta-constraints (reification), table constraints, and global constraints
- Advanced global constraints including cardinality, sequence, knapsack, packing, assignment, lexicographic ordering, deviation, and spread
- Scheduling abstractions and algorithms, including a variety of resource constraints and their underlying algorithms

Markets for
Dynadec's
solution include
shipping &
transportation,
retail and
consumer
packaged goods,
oil and gas,
and general
manufacturing.



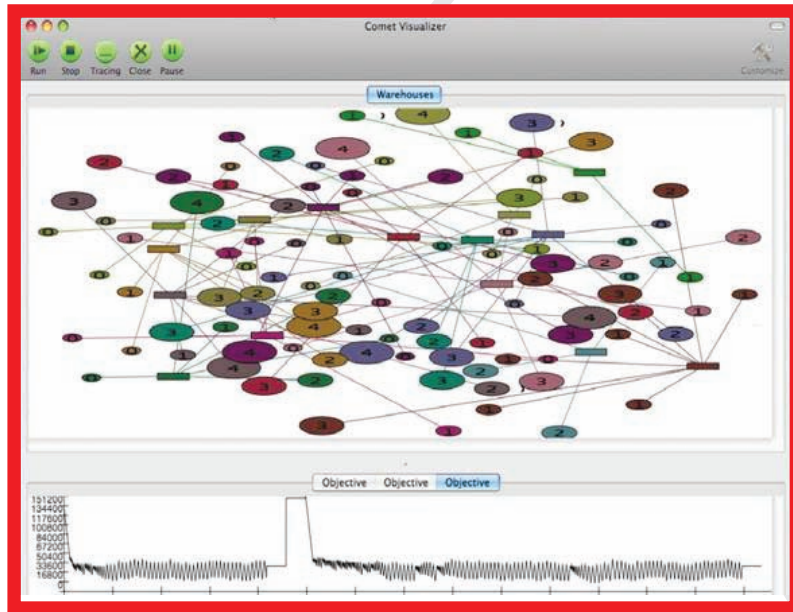
- Ability to specify the search procedure using high-level nondeterministic constructs
- Ability to specify the search controllers that determine how the search tree is explored
- Native support for large neighborhood search
- Transparent parallelization using a work-stealing model

Comet also supports Mathematical Programming through the same modeling language:

- Modeling abstractions for linear and integer programs
- Ability to specify search procedures using high-level nondeterministic constructs
- Support for column generation and sensitivity analysis

Comet offers advanced integration capabilities:

- Solvers are first-class objects and can be naturally interleaved
- Support for constraint-based column generation as a combination of MP, CBLS, and CP
- Programming APIs available for JAVA and C++
- Platform Support includes 32 and 64 bit versions for MAC OSX, Windows XP and Vista, and several flavors of Linux including Ubuntu, Fedora, RedHat and Suse



Example of Dynadec dynamically planning inventory scenarios across a network of warehouses, distribution centers, and stores.

About Dynadec:

Dynamic Decision Technologies, Inc., d.b.a. Dynadec, was formed to commercialize the inventions of the Optimization Laboratory at Brown University. Dynadec maintains an exclusive license to Comet™. This next-generation optimization platform, which uniquely combines techniques for Constraint Programming, Mathematical Programming, and Constraint-Based Local Search, dramatically simplifies the design and implementation of optimization algorithms while preserving the efficiency of low-level, problem-specific implementations. The result is an award-winning, proven technology platform that can be harnessed for solving complex combinatorial optimization problems in areas such as resource allocation and scheduling.

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