GAMS

Optimization

www.gams.com

Support

Sales

Solvers

Documentation

Model Library

gamsworld.org

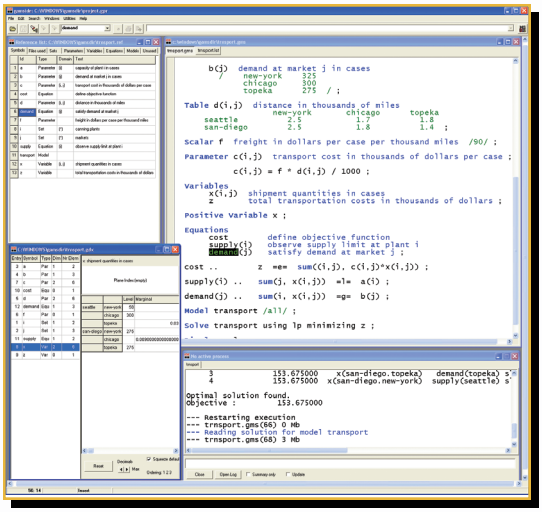
High-Level Modeling

The General Algebraic Modeling System (GAMS) is a **high-level modeling system** for mathematical programming problems. GAMS is tailored for complex, large-scale modeling applications, and allows you to build large maintainable models that can be adapted quickly to new situations. Models are **fully portable** from one computer platform to another.

Wide Range of Model Types

GAMS allows the formulation of models in **many different problem classes**, including

- Linear (LP) and Mixed Integer Linear (MIP)
- Quadratic Programming (QCP) and Mixed Integer QCP (MIQCP)
- Nonlinear (NLP) and Mixed Integer NLP (MINLP)
- Constrained Nonlinear Systems (CNS)
- Mixed Complementary (MCP)
- Programs with Equilibrium Constraints (MPEC)
- Conic Programming Problems
- Stochastic Linear Problems



GAMS Integrated Developer Environment for editing, debugging and solving models and viewing data.

State-of-the-Art Solvers

GAMS incorporates all major commercial and academic **state-of-the-art solution technologies** for a broad range of problem types, including global nonlinear optimization solvers.

High Performance Grid Computing with GAMS

High Performance Computing Grids are becoming available more widely. We extended the GAMS language to support asynchronous submission and collection of model solution tasks to take advantage of these grid environments. Applications run on a 64 node Linux grid using Sun's Grid Engine at the Wharton School of the University of Pennsylvania, demonstrated significant speed-up.

- Submission and collection loop use standard GAMS syntax
- Support for various grid computing environments
- Support for multi CPU workstations
- Applications:
  - * Scenario Analysis
  - * Monte Carlo Simulation
  - * Lagrangian Relaxation
  - * Dantzig-Wolfe Decomposition

Please contact sales@gams.com for pricing information for your grid computing environment.

C:\tmp\grid_trnsport.gms

grid_trnsport.gms | grid_trnsport.lst

```
supply(i) ..   sum(j, x(i,j))  =l=  a(i) ;

demand(j) ..   sum(i, x(i,j))  =g=  b(j) ;

Model transport /all/ ;

set s scenarios / s1*s5 /;

parameter report(s,i,j) solution report
          handle(s)     solve handles for collection;

option limrow=0, limcol=0, solprint=off;
transport.solvelink = 3;

* Asynchronious solves of all scenarios
loop(s,
    b(j) = b(j)*uniform(.95,1.05);
    Solve transport using lp minimizing z;
    handle(s) = transport.handle);

* Result collection loop
repeat
    loop(s$handle(s),
       if(handlestatus(handle(s))=2,
          transport.handle = handle(s);
          execute_loadhandle transport;
          report(s,i,j) = x.l(i,j);
          display transport.solvestat,transport.modelstat,
                  transport.resusd,transport.objval;
          handle(s) = 0) ) ;
    if(card(handle), display 'go to sleep';  execute 'sleep 1');
until card(handle) = 0;
display report;
```

A parallelized version of the transport model ready to run in a grid environment. Note the seperate submission and collection loop

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