Optimization for Real-World Enterprise Challenges

D-Wave's Stride™ hybrid solver combines quantum and classical computing resources to give users the ability to quickly find solutions to large optimization problems that can be hard for classical computing to solve.

By directly modeling nonlinear objectives and constraints, and with its ability to solve problems that don't scale well with traditional solvers, the Stride hybrid solver helps organizations:

- Improve decision quality for business-critical planning and allocation problems
- Tackle optimization challenges where interactions and trade-offs drive outcomes

The Stride hybrid solver supports up to two million variables and constraints, enabling enterprises to address computationally intensive optimization problems for business-critical workflows such as workforce scheduling, logistics routing, price optimization, production scheduling, and more.

Four Disciplines of Optimization in One Solver

D-Wave's Stride hybrid solver is the only solution on the market that draws from four disciplines of optimization to help enterprises solve complicated computational problems, potentially transforming operations and driving bottom line ROI:

1

Quantum Optimization:
Leverages real-time access to advanced quantum computers to solve complex problems.

2

Mixed-Integer or Linear Programming:
Incorporates the best of linear programming to solve problems efficiently even as datasets grow in size and complexity.

3

Lists, Sets, and Other Combinatorial Variables:
Allow for a more natural representation of users' optimization problems, resulting in simpler and more-intuitive implementations.

4

Tensor Programming:
Supports models that are conceptually simple and hardware efficient, reducing development and maintenance effort while enabling superior performance and scaling.

Applications in Practice

Improving Manufacturing Efficiency

BASF, one of the world's leading chemical companies, used the Stride hybrid solver to optimize manufacturing workflows in a BASF liquid-filling facility. The hybrid technology set a new benchmark for manufacturing efficiency at BASF, allowing reduction of production scheduling time from 10 hours to just seconds.
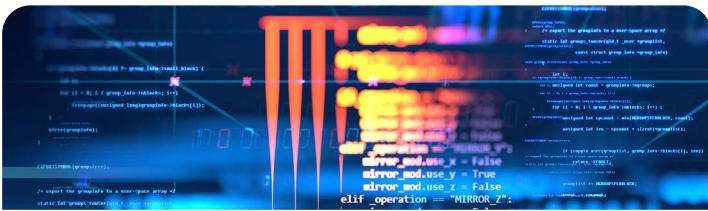
Optimizing Database Operations

Researchers at the University of Southern California (USC) used D-Wave's Stride hybrid solver to improve how databases determine the most effective sequence for joining large sets of data. By integrating the hybrid solver into the query planning process, USC accelerated performance and increased the speed of the query execution by up to 13x on some instances.

Placement of Police Vehicles for Optimal Emergency Response

North Wales Police (NWP) completed of a joint proof-of technology (POT) project leveraging D-Wave's Stride hybrid solver to optimize placement of police vehicles for emergency response. The Stride hybrid solver delivered a faster, more accurate, and more efficient solution than classical methods alone, providing NWP with the ability to reduce the average incident response time by nearly 50%. The POT also demonstrated that NWP could respond to at least 90% of incidents within their target response time.

Optimization of Autonomous Agriculture Vehicle Movements

D-Wave built a commercial hybrid application with the Stride hybrid solver to simulate and optimize the large-scale movement of autonomous agriculture vehicles for Verge Ag. As a result, Verge Ag was able to calculate machine routes in one tenth of the time it took previously.

Expanded Capabilities with Machine Learning

The Stride hybrid solver supports surrogate modeling, enabling it to accept machine-learning models directly. This turns data-driven inputs into solvable optimization problems such fields as predictive maintenance, surge pricing, advertising campaign optimization, and employee scheduling.

Access and Availability

- Accessible through D-Wave's high availability Leap™ quantum cloud service.
- Develop with D-Wave's Ocean™ SDK, offering Python-based tools and programmatic access to the solver.
- SOC 2 Type 2 compliance to support production-grade use.

GET IN TOUCH ⋮ **Contact a D-Wave sales representative to discuss your optimization needs.**