



Digital Annealer

FUJITSU Quantum-Inspired Computing

The World's First Quantum-Inspired Technology
Delivering Performance Generations Ahead

shaping tomorrow with you

Optimize and Innovate with Digital Annealer



Automotive: Factory Optimization

Car manufacturers are looking to improve production efficiencies in order to accelerate deployment of new vehicles. Tasks include logistics improvements, vehicle design and robotics optimization. Digital Annealer-powered production aims to identify errors and flaws such as corrosion, defects and quality issues immediately improving overall production planning and ultimately vehicle delivery.



Bio/Material Science: Molecular Similarity Search

Chemical and pharmaceutical laboratories use molecular similarity searching, which partially extracts molecule characteristics to search for new substances and to develop new drugs. Digital Annealer-powered research explores entire molecular structures without relying on extraction, thereby enabling accurate, instant similarity searching.



Financial Services: Low-Risk Portfolio Optimization

A Digital Annealer powered portfolio solution finds the ideal investment allocation to maximize returns by grouping stocks that correlate with price variations, enabling portfolios to be managed with accuracy and reduced risk. The Digital Annealer solution can instantly find the best permutation from among 20 or more stocks (equivalent to more than one quintillion permutations).



Distribution: Warehouse Inventory Management

In factories and distribution warehouses, the time it takes workers to walk around picking parts can be lengthy. Using Digital Annealer in a factory environment, the Fujitsu IT services team was able to optimize routes and in-stock part placement so workers can successfully reduce distance traveled by up to 45 percent, significantly increasing productivity.



Retail: Personalized Digital Marketing

Using Digital Annealer, marketing agencies and retail companies can accurately and instantly deliver personalized content to existing and prospective customers through engaging and targeted web content, thereby influencing their purchase decisions.



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<http://www.fujitsu.com/global/digitalannealer/>



FUJITSU Quantum-Inspired Computing Digital Annealer

Fujitsu delivers Technology and Services with Quantum-Inspired Technology; providing a bridge to the Quantum world without the complexities of traditional Quantum Computers



Achieving the Impossible

Innovating business processes and operations through the use of Artificial Intelligence and advanced technology to drive digital innovation and transformation is becoming a top priority for organizations striving for a competitive advantage. However, solving complex optimization problems quickly with existing classical computers is essentially unattainable today. As a result, companies need to leverage advanced technologies and additional computing power to grow their business, reduce costs and improve profitability.

With the recent advancements in quantum-inspired computing methods led by Fujitsu, companies can transform global business and society by solving real world, large-scale optimization problems today; problems which are otherwise unsolvable with the solutions available in the market.

Combinatorial Optimization Problems

Combinatorial optimization refers to finding the optimal solution from a finite set of options. However, as the finite set of options increases, the computational power and the time needed to find the solution increases exponentially. For example, in the case of the 'traveling salesman problem' if the salesman must travel to 30 cities, then it will take the most powerful classical computer on the market today approximately 800 million years to find the shortest possible route. Using Digital Annealer, these types of problems can now be solved in less than a second. It is an extraordinary opportunity to optimize and innovate within your business environment.

Why Digital Annealer?

-  Digital circuit design inspired by quantum phenomena
-  8192-bit full connectivity, allowing all bits to freely exchange signals, in order to solve large-scale problems
-  Inter-bit coupling, providing 64-bit (2^{64}) gradations and extreme accuracy in comparison to all traditional quantum technology in the market today
-  Operates at room temperature versus absolute zero (-273.15°C) which is typically required for quantum computing solutions
-  Integrates seamlessly into standard data center operating environments without the need for specific expertise or complex infrastructure

Services

APIs are available as part of a cloud service along with comprehensive integration and support services to complement the Digital Annealer architecture so businesses can spend more time innovating rather than integrating new technology. <http://www.fujitsu.com/global/digitalannealer/services/>

Technology for the Complex Problems of Today and Tomorrow

Today's classical computers cater to basic compute requirements, but cannot handle problems in society which require compute power several orders of magnitude beyond current technology. As the limit of Moore's Law approaches, quantum computers are being explored as the next step, but they are still early in their development and not yet ready for mainstream application. Fujitsu's Digital Annealer is the world's first quantum-inspired digital technology architecture. Available today, Digital Annealer drives innovation in this exciting space and rapidly solves problems across the enterprise, driving optimization in business processes and production operations.



Collaboration with Top-tier Global Partners

Fujitsu remains committed to developing leading technology to serve our global customers, and close collaboration with partners is essential to support our customers' success. Fujitsu has established a strategic partnership agreement with IQbit (a Canadian company), the only vendor of commercial quantum computer software, and an innovation hub with the internationally renowned University of Toronto, to advance our quantum-inspired technology and to continue to drive innovation in this exciting space.

Of course, our relationship with Fujitsu is a real honor for all of us here at IQbit. IQbit has been working with a number of companies that are focused on producing quantum hardware, but the Fujitsu Digital Annealer is one of the first pieces of really usable hardware that can leverage all of the research that IQbit has engineered over the past four years.

We greatly value our research collaborations with Fujitsu through the Fujitsu Co-Creation Research Laboratory at the University of Toronto. We are proud to have contributed to the creation of the Digital Annealer, and we are looking forward to solving many problems in engineering, environment, medicine, smart cities, and finance, using the Digital Annealer.



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