

What industries are using quantum computing?

Our customers, collaborators, and users have built more than 250 early quantum applications, in areas as diverse as scheduling, logistics management, quantum chemistry simulation, financial modeling, preventative healthcare, traffic flow optimization, and so much more.



Manufacturing & Supply Chain Efficiencies:

- **GE Research** has built a [logistics management application](#) that can ultimately help with preventive maintenance and scheduling repairs for their equipment.
- **Volkswagen** used a hybrid solver service to build a paint shop scheduling application which is designed to optimize the order in which cars are being painted. Once in full production it will provide manufacturing efficiencies and performance improvements.
- **DENSO Corporation**, a leading supplier of advanced automotive technology, systems, and components developed a proof-of-concept aimed at optimizing control of automated guided vehicles on their factory floors.



Environmental Impact:

- Looking at reducing CO2 and also balancing scheduling needs, **Mitsubishi Estate** is working with **Groovenauts** to enable their AI with D-Wave's quantum computing techniques to solve the problem of labor shortages for waste collection staff, while also lowering overall CO2 emissions for Tokyo. This proof of concept [leveraged their AI and D-Wave quantum computing](#) to find optimal routes and reduce CO2 gases by efficiently collecting waste created at buildings owned by Mitsubishi Estate. Optimized routes and scheduling were built and provided a 57% reduction in CO2 emissions, reduced the number of vehicles needed by 59% and had a total work time reduction of 38%.



Scheduling & Logistics Support:

- **Save-On-Foods**, a western Canadian grocery retailer, successfully used a quantum hybrid solver service to find solutions for complex grocery optimization problems. They reported that they were able to reduce the time needed for one optimization task from 25 hours to just 2 minutes per week saving time and money.
- **Fukuoka-based Groovenauts, Inc.** launched a commercial service integrating quantum annealing computing technology into their technology offering because they found quantum computing to be the best way to efficiently plan staff schedules for retail stores and distribution logistics companies.
- **Australian Department of Defence** worked with D-Wave and NEC-Australia to develop a [last-mile resupply quantum computing application](#) to showcase the ability to optimize autonomous vehicles resupplying forces with quantum computing technology.





Traffic Optimization:

- **Volkswagen** has used D-Wave's technology to develop traffic optimization applications. In 2018, the team developed a proof-of-concept application using actual taxi data from Beijing to [optimize the flow of traffic](#). In 2019, Volkswagen again used quantum computing to develop a public transit traffic routing service. This was the first quantum application deployed in-production in the real world, as they used it to [optimize nine buses and 26 stops](#) during the international technology conference Web Summit in Lisbon.



Financial Services:

- **Multiverse Computing**, a financial services startup, saw faster runtimes and higher overall returns when building out a portfolio optimization solution on D-Wave's quantum hybrid solver services.



Health Care & Life Sciences:

- **University of Southern California** and their research partners applied quantum annealing to ML approaches for [several problems](#) in the life and physical sciences, including TF-DNA binding, cancer classification, and solving a Higgs boson optimization problem.
- **Menten AI**, a protein design start-up, has been using hybrid quantum annealing approaches for more than two years as a way to design proteins by leveraging synthetic biology, machine learning, and quantum computing to create new proteins not found in nature for diverse applications in the pharmaceutical and chemical industries. Recently, they used D-Wave's hybrid solver service to determine protein structure for de novo protein design. In 2020, Menten's unique protein designs were computationally validated, chemically synthesized, and are being advanced to live-virus testing against COVID-19.

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