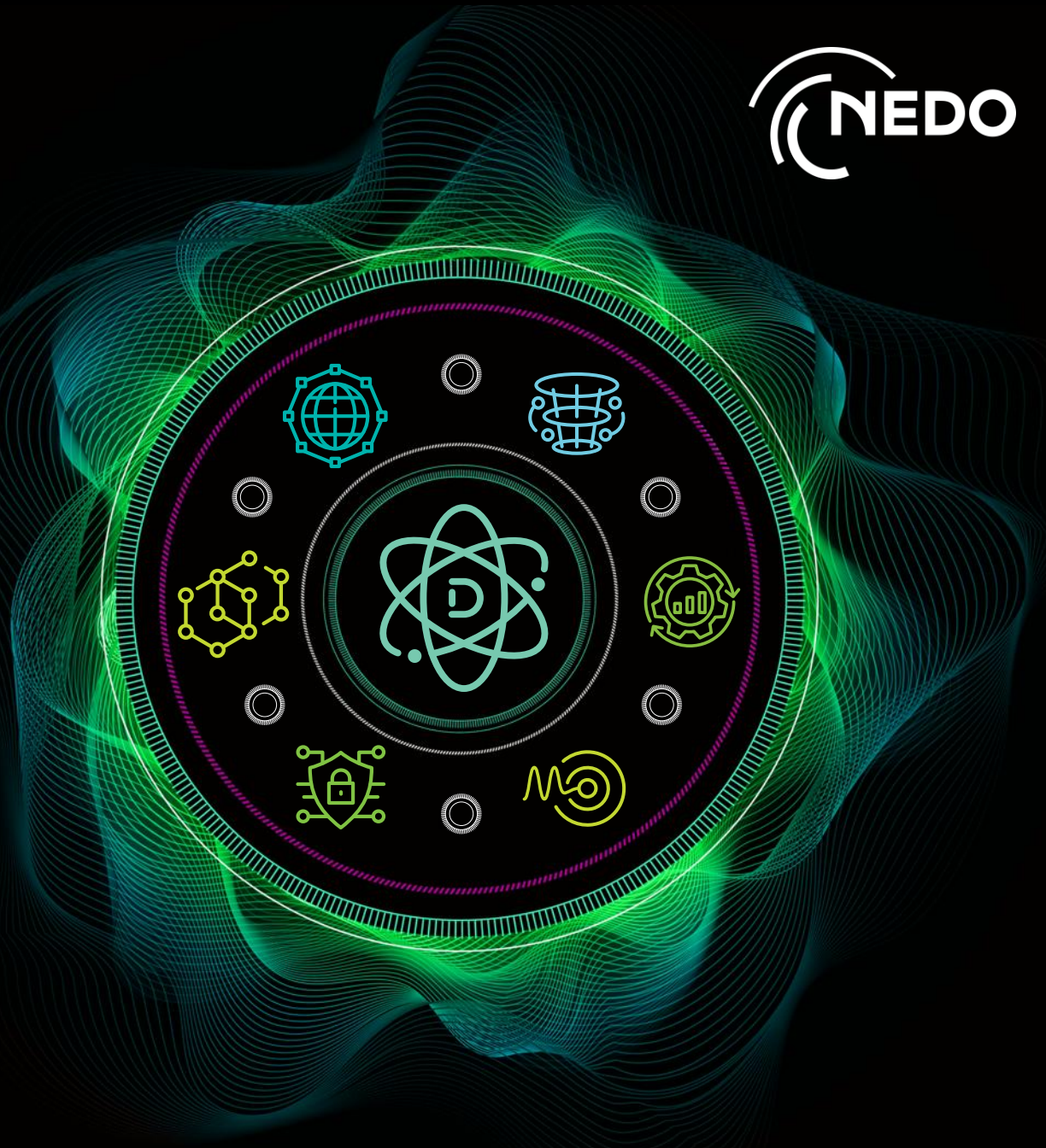
Quantum Computing Use Cases

Optimization of delivery planning

ITOCHU Techno Solutions,
TriValue, A-Star Quantum



New Energy and Industrial Technology Development Organization (NEDO)

ITOCHU Techno Solutions, TriValue, A-Star Quantum: Optimization of delivery planning [2025/6] 1/2

Operational Use

Industry	Transportation
Means	Transportation of Goods _ Land Transport
Method	combinatorial optimization
Category	–

Background

- In recent years, the importance of logistics has increased as an infrastructure that supports society, but there are a variety of issues
  - ✓ Driver shortage, traffic congestion, increased CO2 emissions, etc.
- High-precision dispatch and route planning depend on trial and error by skilled personnel, resulting in a large workload and lead time. Due to the early closing of orders, the opportunity loss of vacant cars is also a problem.
- Combining CTC's transportation and delivery optimization know-how, TriValue's field expertise, and A-Star Quantum's quantum computation and mathematical optimization technologies, we jointly developed OptyLiner, aiming at high-speed automation of delivery plans and quality maintenance and improvement.

Issues and motivation to be solved

- Shorten the time required to create delivery plans and stably provide planning quality equal to or better than that of skilled workers
- Fine-tuning conditions and iterative simulations are performed in seconds to avoid early deadlines, reduce empty cars, and maintain service levels.

Problem setting as a quantum computer

- OptyLiner takes into account multiple factors, such as vehicle load and number of vehicles and driver working hours, and quickly calculates the optimal delivery route that minimizes travel distance, number of vehicles in operation and CO2 emissions.
  - ➢ In the demonstration, OptyLiner completes route calculations in 5 seconds, compared to previous systems that took anywhere from a few minutes to over 20 minutes per calculation.

Reference: ITOCHU Techno Solutions Co., Ltd.: "Development of OptyLiner, which uses quantum computing and mathematical optimization to create delivery routes Demonstration reduced delivery planning time by approximately 95%" (https://www.ctc-g.co.jp/company/release/20250612-01921.html)

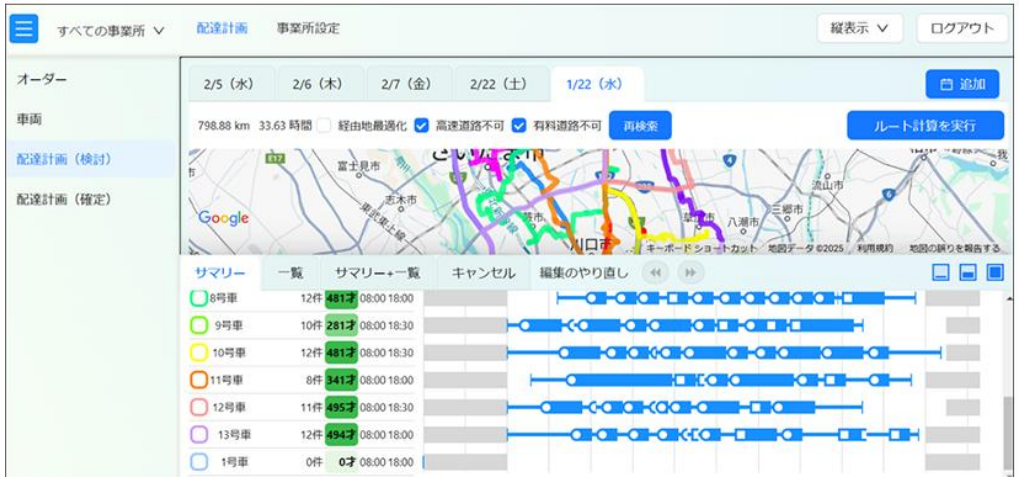
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Expected business benefits

- Dramatic reduction in planning time (approx. 95%) and speedup of iterative review to push back order deadlines, expand order opportunities, and reduce vacancies
- Reducing operating costs, fuel costs and CO2 emissions by reducing the number of vehicles in operation and shortening the total distance
- Standardize quality equivalent to or higher than that of skilled personnel, reduce personnel attributes and shorten training periods
- The price starts from 200,000 yen per month (excluding tax), and the target sales is 2 billion yen in 3 years.



Distribution planning image in OptyLiner

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More use cases are available on our website. We invite you to explore them.
https://www.quantum-computing-use-cases.nedo.go.jp/english/

More Use Cases

New Energy and Industrial Technology Development Organization (NEDO)
AI and Robotics Department (e-mail: quantum_ai@ml.nedo.go.jp)

This collection of use cases was obtained as a result of the work commissioned by the New Energy and Industrial Technology Development Organization (NEDO) "Cyber-Physical Development Business of Quantum/Classical Hybrid Technology/Study of Use Case of Quantum Technology" and the "Post-5G Information and Communications System Infrastructure Reinforcement R & D Project (Quantum Industrialization)/Comprehensive Study for Promoting the Industrialization of Quantum Computers".