

Inspired by the Future, Actioned Immediately

Quantum-Inspired Computing helps
the public sector achieve Always
Optimal Performance

“The public sector needs to be ambitious,” says Thierry Kahane, Fujitsu America, Inc. AI & Analytics Practice Leader for North America, “And harnessing the power of quantum-inspired computing can be proof of that ambition. It’s the best way to optimize the way government works to deliver tangible benefits to citizens – now.”



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Quantum computing is still a futuristic concept. The ability to operate computers at scale based on quantum mechanics is five to ten years away. But the concept is as old as computing itself, and the benefits are clear. Complex problems can be analyzed at lightning speed and efficient answers can be found through what’s called ‘combinatorial optimization’ – the ability to bring together a vast number of data points and interactions to rapidly yield insights about what’s happening now and determine what the best course of action is in response.

The public sector is all about seeking optimal outcomes for citizens. And that starts with asking the right questions based on the best data available. Going through every possibility takes time. And time is usually not on the side of government when dealing with complex problems: decisions have to be made quickly because people,

infrastructure, events, and security demand rapid action in ever-changing environments.

“We need to focus on the key problems which can benefit right now from faster combinatorial optimization at larger scale,” says Thierry. “We can’t wait for true quantum, the public sector has to face immediate challenges. That’s what Fujitsu’s Quantum-Inspired Computing has been designed to do: bringing the future forward.”

Combinatorial optimization problems are complex because they involve huge volumes of data to tackle big scale issues, just the kind which governments have to deal with every day. Every problem is a puzzle: if you have 15 pieces and had the help of every person on Earth it would take three minutes to work out every possible combination. Add just five more pieces and it would take ten YEARS’.

shaping tomorrow with you



The Fujitsu Digital Annealer mimics the power of quantum without actually being a quantum computer. So, you can take large scale problems, combine multiple data points, and then achieve an optimized result much faster than any classical computer could.

“The key is to pick the right problem – a BIG problem,” stresses Thierry, “The public sector is full of big problems – things that need to be understood at scale, and then solved at scale.” Governments, at all levels can benefit, including government owned infrastructure like ports. The port of Hamburg, for instance, had a big problem: Ensuring 12,000 trucks each day could flow through this large port to keep trade flows moving. The Digital Annealer got to work and optimized the traffic lights system to cope with rising and falling roadway use.

It was a big problem, but one that was focused on a single location and with a pre-determined outcome. “That was a good way to prove the concept of combinatorial optimization,” says Thierry. “One problem with one goal; do it, prove it, then scale up.”

Complexity often leads to costs. The public sector is necessarily a complex sector, and costs are always under scrutiny. The ability to optimize both processes and systems at scale means that improvements in efficiency and cost control can make a significant difference to the way government works. And when government works better, citizens are more willing to support it. They can see tangible value from their taxes and get the outcomes they want.

And scale is the point; health care utilization planning and distribution of supplies, medicines or vaccines can be optimized up to 10,000 times faster than industry standard computers. The same is true for complex infrastructure, from rail to roads. And services such as mail systems can be optimized at a national and local level to speed the flow of items and ensure efficient use of resources.

The public sector has to deal with huge challenges: public health, climate change, economic stability, and both internal and national security. Combinatorial optimization performed by quantum-inspired computing brings future solutions forward so you can make a difference to benefit citizens now.

Quantum-inspired combinatorial optimization in the public sector



Public and private medical research and life sciences organizations are able to better understand issues down to the molecular level, promising faster remedies, cures, and vaccines.



Energy networks are being optimized to improve service delivery, efficiency, reduce waste, and cut GHG emissions.



Transport routes are being optimized in terms of usage as well as planning to cut delays, reduce commutes, and benefit both the economy and environment.

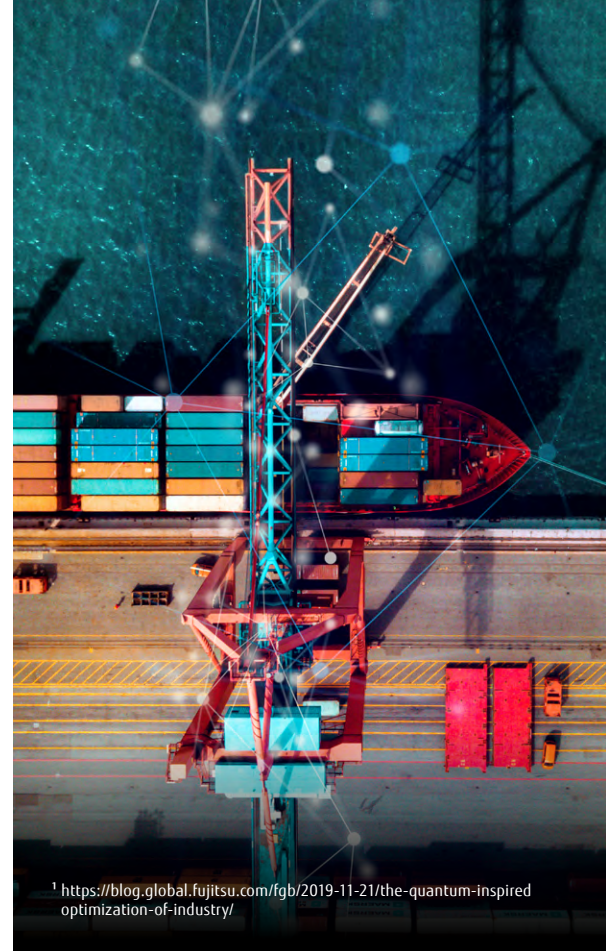


In the UK the Digital Annealer is being used to help the UK Space Agency deal with space-debris orbiting the Earth and endangering established and new satellites.



In Japan, the postal system was able to deliver more items with fewer trucks using better routes – cutting costs and improving service.

Fujitsu works closely with North American public sector organizations to deploy and further develop our solutions to meet the urgent and ever-changing needs of government. The Fujitsu North America AI & Analytics practice develops and deploys **IP-based, innovative solutions** powered by emerging technologies such as AI/ML, Advanced Analytics, IoT and Quantum Computing.



¹ <https://blog.global.fujitsu.com/fgb/2019-11-21/the-quantum-inspired-optimization-of-industry/>

