Press Release

TIM is the first operator in Europe to use quantum computing live on its mobile networks (4.5G and 5G)

Extremely faster optimisation processes, meaning better quality of experience for end customers

Rome, 25 February 2020

TIM is the first telecommunications operator in Europe to implement *quantum computing* algorithms in planning its next generation mobile networks. Quantum computers are based on *qubits*, basic units of information similar to traditional bits that exploit the principles of quantum mechanics to process complex problems and large calculations in extremely short times compared to traditional computers. The computational potential of quantum computers makes it possible to tackle problems that are beyond the reach of traditional computers due to their complexity.

TIM has optimised planning of radio cells, framing the problem within a QUBO (quadratic unconstrained binary optimisation) algorithmic model, carried out on D-Wave's 2000Q™ quantum computer. D-Wave is a world leader in the production of commercial quantum computing hardware, software and services. All this has made it possible to develop radio cell planning that ensures reliable mobile services with high performance.

Implementing quantum computing in telco networks is highly innovative, given that the technology has been so far applied mainly in the financial, automotive and chemical industries. The QUBO algorithm has been used to plan 4.5G and 5G network parameters, performing 10 times faster than traditional optimisation methods.

Since computing speed is expected to improve further as quantum computer technology evolves, the ability to configure the network in real time is a key aspect in providing customers with better mobile service.

The application of the QUBO algorithm to the planning of cell IDs – which allow smartphones to distinguish each radio cell from the others – provides TIM customers with greater VoLTE (Voice over LTE) service quality, improving its steadiness when on the move between the areas covered by different cells.

The ability to carry out real-time network configuration is also part of the innovative paradigm of the SON (self-organising network) 'closed circuit', already in use by TIM and based on field measurements and rapid reconfiguration of network elements.

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