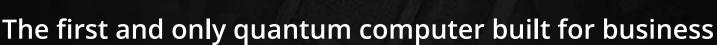
# advantage



Advantage is the first and only quantum system designed for business and is the most powerful and connected commercial quantum computer in the world. With more than 5000 qubits, 15-way connectivity, and powerful hybrid solvers, Advantage gives customers the ability to solve far larger, more complex problems and drive real-world value for their businesses. The all-new Advantage performance update includes a newly fabricated QPU for even better business performance. Now, customers can solve even larger and more complex problems faster, with more precision.

The latest and greatest Advantage performance update includes a newly fabricated QPU for even better business performance. Now, customers can solve even larger and more complex problems faster, with more precision. The Advantage™ system is available through the Leap™ quantum cloud service.





For more information about the system, contact us at sales@dwavesys.com, or visit us at www.dwavesys.com.

#### **Key Benefits of Advantage**

Advantage is the most connected and powerful commercial quantum computer in the world, allowing customers to solve larger, more complex real-world problems.

- Richer topology: The Advantage quantum processing unit (QPU) has 5000+ qubits with 15-way connectivity. This topology makes Advantage ideal for solving real-world optimization problems in the enterprise, such as employee scheduling and transportation routing.
- Better solutions: With 2.5x greater connectivity, larger, more complex problems can be more efficiently mapped to Advantage than to previous-generation systems, giving customers higher quality solutions.
- Much larger problems: The Leap hybrid solver service (HSS) accepts business-sized problems and solves them on a combination of quantum and classical resources using advanced algorithms. The HSS accepts problems of up to 1 million variables making it suitable for truly enterprisescale problem solving. In addition to discrete and continuous variables, the HSS accepts up to 100,000 constraints, giving customers more flexibility and a more native representation of problems
- Quantum annealing controls: The Advantage system gives power users fine-grained control over the quantum annealing process, supporting:
  - · Per-qubit anneal offsets.
  - Changes to the global anneal schedule, including annealing time, anneal pause and quench, and reverse anneal.
  - Time-dependent gain on linear coefficients.





## **Leap Quantum Cloud Service**

Leap brings quantum computing to the real world by providing secure, real-time cloud access to Advantage and other solvers. Code in-place using an online integrated developer environment (IDE) with plenty of examples, and all the programming and visualization tools you need. Sign up here: https://cloud.dwavesys.com/leap



#### **Ocean SDK**

D-Wave's Python-based software development kit, Ocean, reduces time to application development for D-Wave solvers. Open-sourced on GitHub, Ocean facilitates collaborative projects that can leverage quantum and hybrid quantum/ classical resources.

### Try it out:

- Ocean SDK: https://github.com/dwavesystems
- Ocean docs: https://docs.ocean.dwavesys.com

#### Solver API

Calls to the system go through the Solver API (SAPI), a RESTful interface responsible for user authentication, user interaction, and work scheduling. SAPI connects to backend servers that send problems to and return results from Advantage and other solvers.

#### **QPU Specifications**

Number of qubits 5000+ Number of couplers 35,000+ Graph size P16 (Pegasus) Qubit temperature  $< 15 \, \text{mK}$ 

**Dimensions** 

3.0 m (10 ft.) Length Width 2.1 m (7 ft.) Height 3.0 m (10 ft.) 3800 kg (8400 lbs.) Mass

Power

Rated power 25 kW, maximum 120/208 V, 60 Hz (standard) Mains voltage 230/400 V, 50 Hz (international) 3 Wire + N + PE

Mains connection

Cooling

15 kW of cooling (4.3 refrigeration tons) Coolant Max. water pressure 6 bar (88 psi) Min. temperature 15 °C @ 9.4 L/minute (2.5 gpm @ 50 °F) 25 °C @ 20.5 L/minute (5.4 gpm @ 77 °F) Max. temperature **HVAC** 5 kW (17,000 BTU/h) in normal mode 12.5 kW (43,000 BTU/h) in auxiliary mode

**Regulatory Compliance** 

US UL 62368-1, FCC Part 15 part B Canada CSA C22.2 NO. 62368-1:19

Industry Canada ICES-003, Class A

#### **Environmental Requirements**

Temperature 20 to 25 °C (68 to 77 °F) Operating Rate of change 1 °C (1.8 °F) in 15 minutes (maximum allowable) -10 to 40 °C (14 to 104 °F) Shipping/storage Humidity

Operating 5 to 80% RH (noncondensing) < 85% RH (noncondensing) Shipping/storage

65 to 106 kPa (9.4 to 15.4 psi) Operating Shipping/storage 65 to 106 kPa (9.4 to 15.4 psi) 0 to 2300 m (7500 ft.) Max. building vibration 50 µm per second Ambient magnetic field 100 µT (maximum allowable) Noise level 75 dBA

**Consumable Materials** 

Gases Nitrogen gas Grade 4.8 (99.998%) Helium gas Grade 5.0 (99.999%) Usage: ~1 T-size cylinder each per year Cryogens Liquid nitrogen Usage: ~6L/day (1.6 U.S. gal./day)

Dedicated L2 block; /27 internal

**Networking Requirements** 

L2, L3 requirements

IP addresses Ethernet speed E100 (can be capped at 10 Mbps) IP addresses IPv4 externally available; assigned RI-45 GE (1000BASE-TX) Physical connections