EVIDEN

Qaptiva 800 range

Explore the possibilities of quantum computing and transform theories into practical applications using our all-in-one and best-in-class capabilities.

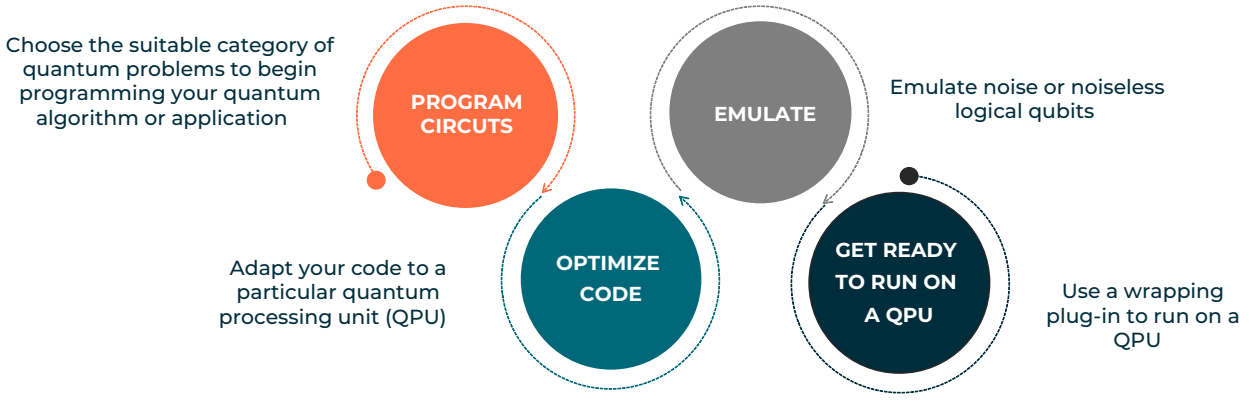
an atos business

Boost discovery and solve complex business issues by unlocking the power of quantum mechanics.

Exploring innovative computing solutions that foster growth and progress is essential in today's world. Quantum computing is a new paradigm that can help solve complex problems and overcome various industry challenges. Quantum Computing revolutionizes the digital potential for organizations across various fields, and it promises to dramatically boost supercomputing power, enabling the simulation of intricate problems in seconds.

The world of quantum computing is rapidly advancing, with different approaches for both software and hardware, including superconducting, photonics, neutral atoms, and trapped ions. To stay ahead in the competition, it is essential for businesses and organizations to embrace Quantum Computing technology as soon as possible, without waiting for quantum computers with enough qubits, identify and develop applications, and stay updated with the latest trends.

Qaptiva 800 is a stand-alone appliance created by Eviden for quantum computing research and engineering that offers full-stack computing capabilities for developing, improving, and experimenting with algorithms and quantum applications. It enables the creation of optimized programs for various quantum computer hardware and allows for running emulations.



Powered by Qaptiva 800 stand-alone appliance

Business Benefits

Qaptiva 800 enables quantum computing technology adoption by any organization and optimal design of real quantum applications.

Accelerate time to insight.

The Qaptiva 800 offers a robust development environment that helps develop quantum computing programs and simplifies the programming, emulation, and execution of quantum algorithms and applications for greater ease and convenience.

Adapt quickly and easily.

Choose the best programming paradigms for your needs (gate-based, annealing, and analog) and focus on developing your application and algorithms without being limited by the availability, capacity, and costs of quantum computers.

Helps to secure your sensitive data.

Increase the confidentiality and privacy of research programs and innovation projects. Qaptiva 800 is a stand-alone appliance that can be installed on your premises and integrated easily with your existing infrastructure.

Future-proof your investment.

Simulate various quantum technologies through a software and hardware agnostic platform. Optimize your code and compile it to operate on any quantum computer.

Spark creativity.

Gather insight directly from Qaptiva 800 to better understand your quantum processing unit (QPU) behavior and identify potential improvement areas.

Leverage best-of-breed technology.

Eviden is a pioneer in quantum computing technology and High-Performance Computing (HPC), and you benefit from a recognized, patented, experienced, and trusted partner.

Technical Benefits

Qaptiva 800 offers an all-in-one quantum computing application development platform with unique features and advanced capabilities.

Maximize your productivity.

Improve your work by accessing various programming tools, high-level business application libraries, example or illustrative notebooks, state-of-the-art algorithms, and third-party open-source connectors in one convenient location.

The Qaptiva 800 appliance can be connected to quantum processing units.

Use less memory and run faster.

Take advantage of Qaptiva's extensive range of optimization tools that help to adapt circuits by reducing the gates according to the target QPU's gate set type and prepare it to run on any quantum computer with maximum performance.

Thanks to a wide range of configuration appliances, you can run simulations 2 to 16 times faster by launching them in parallel while enjoying the benefits of a GPU-accelerated appliance.

Run high-performance emulations.

With Qaptiva 800, you can run quantum algorithms and circuits using up to 40 logical qubits in the most entangled cases.

This appliance can emulate physical noise, so you can use it as if you were running calculations on an actual quantum computer affected by these noise sources. Using the noise study, you can adapt your program to get the best out of your QPU.

Experience freedom and peace of mind with flexible and secure access.

You can access the Qaptiva appliance in two ways: interactively through SSH on your machine or via a user-friendly web interface using the open-source Jupyter Notebook software.Integrate easily with your identity and access management solution for increased security.

High level of extensibility and interoperability.

You can develop your plugin using our SDK and customize the execution stack.

If you choose to, you have the ability to link up to other quantum frameworks that are based on Python and easily import/export codes from other languages.

(OpenQASM, Perceval, Cirq, Pyquil, ProjectQ and Qiskit)

Prepare for the Fault-Tolerant Quantum Computation era.

With the help of Qaptiva Q-Pragma, HPC centers can implement HPC-Quantum hybridization on a larger scale through a hybrid programming technology that enables heterogeneous computing by allocating memory and scheduling workloads or processes to different processors.

Features and Capabilities

A multi-patented, unique hardware infrastructure with large in-memory capacity that can used by multiple developers simultaneously with the option to integrate a dedicated hardware accelerator (GPU).

Program circuits

- Provides a universal, hardware and software agnostic, quantum programming model.
- Offers a high-level quantum hybrid programming language built on the widely used Python language. It's tailored for NISQ[1] algorithms, in particular variational algorithms.
- Supports gate-based computing, quantum annealing, and analog computing. It offers plugins in various programming languages and an SDK to integrate algorithms seamlessly.
- Exposes an abstraction layer (Atos Quantum ASseMbly python) for generating a universal quantum assembly programming code (AQASM) and hybrid simulation.
- Allows for the easy creation of gates and sub-programs with reusable sequences of gates within a quantum program.
- A Jupyter Notebook server-client application allows displaying, editing, and running notebook documents via a web browser. This application comes with a vast collection of p-re-built, ready-to-use sets of mathematic quantum libraries, algorithms, and routines, making it easy to start your projects immediately.

Optimize code

- Best-in-class optimization suite that allows different quantum circuits to be adapted to a particular hardware by creating custom plug-ins, rewriting gate sets, and making it compliant with the physical topology of the quantum hardware.

Emulate circuits or run on a quantum processing unit (QPU)

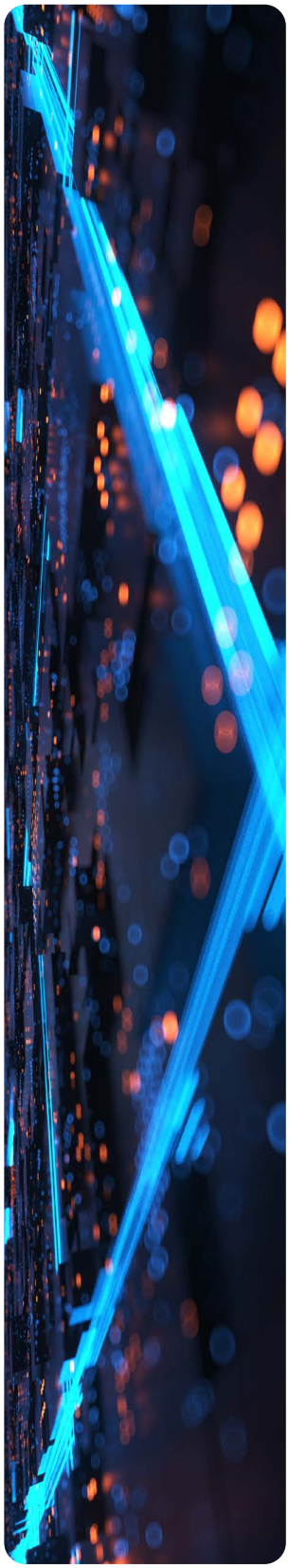
- Emulation of a quantum program for full-state vector simulation of up to 40 qubits for any circuit.
- Emulating noisy QPU with an option to implement the noise models without reducing the available qubits.
    - When simulating physics, various models for quantum noise are utilized. Appropriate noise models are selected to resemble reality closely, depending on the technology used, such as trapped ions, superconducting circuits, or semiconducting silicon.
    - Noise model characterization

The emulation environment will consist of at least five simulators:

- Linalg
- Feynman
- Stabilizers (stabs)
- Matrix Product State (mps) and Adanced Matrix Product State (qpeg)
- Quantum Multi-valued Decision Diagrams
- Noisy QPU
- Simulated quantum annealing.
- Annalog QPU

It's possible to simulate quantum annealing of at least 30000 variables and up to 50000 spins, with accuracy much higher than all existing annealing hardware.

- Use a wrapping plug-in to run on a QPU.



[1] Noisy Intermediate Scale Quantum (NISQ)

Technical specifications

Qaptiva 800 Appliance Range	Qaptiva 802	Qaptiva 804	Qaptiva 808	Qaptiva 816
Hardware configuration	2 sockets – 20C 1.9GHz 2 TB RAM **Optional:** Up to 2 NVIDIA A30 GPUs	4 sockets – 20C 1.9GHz 4 TB RAM **Optional:** Up to 4 NVIDIA A30 GPUs	8 sockets – 20C 1.9GHz 8 TB RAM **Optional:** Up to 8 NVIDIA A30 GPUs	16 sockets – 20C 1.9GHz 32 TB RAM **Optional:** Up to 8 NVIDIA A30 GPUs
Ethernet copper ports	1 x 1Gb/s (RJ45)	2 x 1Gb/s (RJ45)	4 x 1Gb/s (RJ45)	8 x 1Gb/s (RJ45)
Ethernet optical ports	2x 10Gb/s (SFP+)	4x 10Gb/s (SFP+)	8x 10Gb/s (SFP+)	16x 10Gb/s (SFP+)
Power Supply	Voltage / Frequency: 100-120 V / 200-240 V @ 50-60 Hz	Voltage / Frequency: 100-120 V / 200-240 V @ 50-60 Hz	Voltage / Frequency: 100-120 V / 200-240 V @ 50-60 Hz	Voltage / Frequency: 100-120 V / 200-240 V @ 50-60 Hz
	Power cable: C19-C20, 20 A 2xTitanium PSUs up to 3000W	Power cable: C19-C20, 20 A 4xTitanium PSUs up to 3000W	Power cable: C19-C20, 20 A 8xTitanium PSUs up to 3000W	Power cable: C19-C20, 20 A 18xTitanium PSUs up to 3000W
Form Factor	2U	4U	8U	19U
Weight	40Kg	80Kg	160Kg	365Kg
Regulatory Compliance	Safety: CE, IEC, UL, CSA + APAC certifications.			
	Electromagnetic Compatibility: EC, FCC, ICES-03, VCCI certifications.			
	Environment: Global: RoHS II & WEEE directives, REACH regulation. Contact Eviden for local compliance.			

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