World's first reconfigurable discrete analog supercomputer
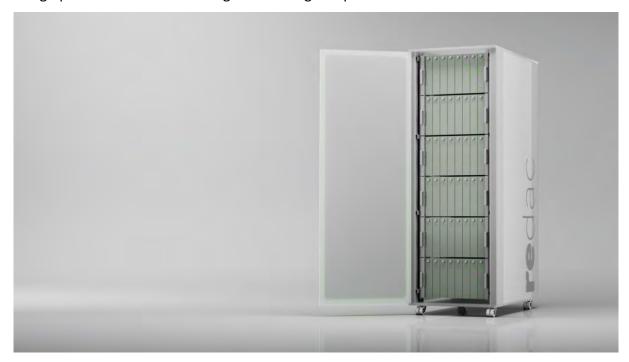
The Reconfigurable Discrete Analog Computer by [anabrid](#) is the world's first datacenter level analog-digital hybrid computer. Developed for the DLR Quantum Computing Initiative with funding by the Federal Ministry for Economic Affairs and Climate Action.

Berlin, Germany – March 28th, 2025 – Today, together with the DLR Quantum Computing Initiative (DLR QCI), anabrid announced the launch of REDAC, a groundbreaking analog supercomputer designed to accelerate scientific research and engineering innovation. Unlike traditional digital computers, REDAC directly models physical systems in real-time, offering unparalleled accuracy and insights into complex phenomena.

REDAC's core comprises over 2.000 computing elements and 40.000 switches, enabling it to solve complex equations like ordinary and partial differential equations (ODEs and PDEs) with exceptional speed, correctness and precision. This makes REDAC an ideal tool for researchers and developers tackling challenges in fields such as fluid dynamics, quantum mechanics, and semiconductor development.

A key feature of REDAC is, that it acts as a "Physical Twin", allowing scientists to create a true analog counterpart of a physical system and observe its behavior in real-time. This provides a level of insight and understanding that goes beyond what can be achieved with conventional digital simulations. At the same time, it serves as a cost-saving test-bed for the architecture design process of custom fit integrated analog compute solutions.

"The REDAC represents the most advanced test-bed for electronics-based unconventional computing approaches." says Dr. Lucas Wetzel, Chief Scientific Officer at anabrid. "It allows to harness the power of analog computing in a modular, scalable package and to apply it to applications ranging from neuromorphic and physics inspired AI, over research in gate-based quantum circuits all the way to real-time satellite control. REDAC implements an innovative calibration routine that enables high accuracy, while being fast and energy-efficient."

REDAC, a project of the DLR Quantum Computing Initiative (DLR QCI) funded by the Federal Ministry for Economic Affairs and Climate Action, introduces a reconfigurable discrete analog computer. Its reconfigurability allows users to adapt it to various equations without altering the computing architecture. Developed by anabrid, a prototype has been delivered to QCI, with continuous feature enhancements planned.

REDAC is designed for easy accessibility and seamless integration to existing computing infrastructure. Its software stack allows users to program a REDAC from digital computers using existing workflows, e.g., from Matlab, python or C++.

Developed by Anabrid for the DLR QCI, the REDAC serves as an important resource for researchers in industry and academia, exploring unconventional computing architectures and approaches. The REDAC platform implements physical dynamical systems to solve practical applications through its analog computing paradigm. For inquiries or further information, please contact QCI or anabrid.

Contact:

Dr. Lucas Wetzel

Chief Scientific Officer

anabrid GmbH

wetzel@anabrid.com

www.anabrid.com/redac

https://qci.dlr.de/redac

Media Kit

Bilder REDAC

Foto Übergabe REDAC an DLR QCI

anabrid Logo

Foto Dr. Lucas Wetzel, Chief Scientific Officer anabrid