

Synopsys and TetraMem

Accelerating Development of a Novel Analog In-Memory Compute AI Accelerator SoC Using Synopsys Cloud

“TetraMem’s analog-RRAM-based in-memory computing technology, inspired by the human brain, changes the paradigm of how AI computations are performed, launching new possibilities for AI everywhere. Designing for a radically different system requires reliable, robust, and flexible engineering tools and collaboration across global working sites. Synopsys Cloud has played a pivotal role in helping us accomplish our mission by providing seamless access to a highly secure and complete SoC design environment. With scalable access to EDA software, pre-configured end-to-end flows, and infrastructure resources, we can tape out quickly and efficiently.”

~Dr. Glenn (Ning) Ge, CEO & Cofounder, TetraMem Inc.



TetraMem

Business

TetraMem Inc, a US-based company founded in Silicon Valley in 2018, is poised to deliver the industry’s most disruptive in-memory computing (IMC) technology for efficient AI applications. TetraMem is the world’s only company to produce a high bit-density multi-level RRAM (aka computing memristor) based accelerator in commercial foundries. The technology was featured in the March 30, 2023 edition of Nature. Our team brings together complementary skill sets and technological know-how ranging from proprietary computing memory devices to novel computing architectures. Learn more at tetramem.com and follow us on [LinkedIn](https://www.linkedin.com/company/tetramem).

Challenges

- Having a global team spread across continents requires a seamless, unified mixed-signal SoC design environment for efficient collaboration
- CAD setup/flows and on-demand scalable and elastic IT resources are needed
- The AI accelerator’s complex design requires smooth integration and verification of analog in-memory computing and the digital RISC-V processor, with critical time-to-market targets

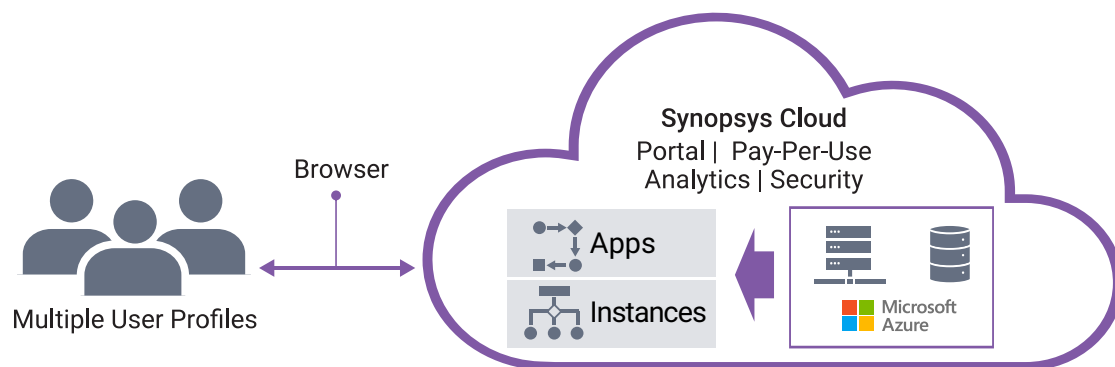
Synopsys Solution

- Pre-configured end-to-end analog design flow helped jumpstart development
- Intuitive and user-friendly browser-based platform for chip design
- On-demand pay-per-use access to unlimited EDA resources without licensing constraints, enabling faster time to results
- Instant availability of scalable and cutting-edge compute and storage

“We were able to achieve a very fast infrastructure setup on the Synopsys Cloud EDA environment within days. The vast selection of EDA tools and IP available on the cloud enabled us to start the design, verification, and backend flow very quickly. The flexibility of using as many licenses as we needed enabled us to obtain fast turnarounds on simulation, verification, and backend flow, which significantly reduced the engineering hours spent on those compute-intensive tasks. The ease of global access provided a single environment for our global R&D team with seamless access.”

~Wenbo Yin, VP of IC Design, TetraMem Inc.

SaaS: Software as a Service—All-in-One Usage Model



Benefits

- **Production environment:** Get up and running in days instead of weeks
- **Complete and intuitive design flow:** Providing simulation and verification capabilities for designs, eliminating the need for CAD setup, and enabling automated PDK and technology setup
- **Improved collaboration and productivity:** Global teams can collaborate on the same schematic, layout, or design step in real time
- **On-demand, pay-per-use access:** Scalable compute and unlimited tool licenses speed time to market, enabling achievement of PPA targets and robust design by allowing more iterations in less time
- **Availability:** Includes the entire portfolio of Synopsys EDA software and high-quality, silicon-proven Synopsys IP

“We are creating the world’s most efficient AI accelerator chip, built around a RISC-V architecture and powered by our novel analog in-memory computing technology. Developing and integrating these elements requires a well-engineered platform to support an iterative and flexible design process in order to meet performance objectives with quality. With Synopsys Cloud, we are able to access a complete, pre-configured design flow that enables our global R&D teams to collaborate efficiently. This improved productivity for our entire team, and helped us architect a robust design for a first-of-its-kind technology.”

~David George, Head of Global Operations, TetraMem Inc.

About Synopsys Cloud

Synopsys Cloud combines the availability of advanced computing and storage infrastructure with unlimited access to EDA software licenses on demand so you can focus on what you do best—design chips—faster. With cloud-native EDA tools and pre-optimized hardware platforms, an extremely flexible business model, and a modern customer experience, Synopsys has reimagined the future of chip design on the cloud that doesn't disrupt proven workflows.

The Synopsys Cloud FlexEDA business model offers two licensing options: pay-per-use (PPU) and cloud subscription license (CSL). PPU is an industry-first, true usage based licensing approach for EDA tools. Synopsys Cloud FlexEDA provides access to unlimited, on-demand EDA software licenses which is a transformational change compared to traditional EDA software licensing models. With Synopsys Cloud FlexEDA, many Synopsys tools are now available for use by the minute, providing customers with the granularity they need for peak usage bursts in the cloud. This helps reduce time to results significantly and deliver a better quality design ahead of time.

Users can choose from two deployment options: Bring-Your-Own-Cloud (BYOC) and Software-as-a-Service (SaaS). Synopsys Cloud offers the flexibility to use either one or both deployment options, depending on customer requirements.

“TetraMem Inc used Synopsys’ responsive worldwide support team during the engagement. One of our challenges from the start was bringing global team members up to speed to meet our product specifications and time-to-market goals. The Synopsys sales, technical support, and R&D teams worked together to help us become familiar with the platform. Any EDA tool upgrades or new tool purchases are delivered immediately without worrying about CAD installation, global environment setup, version compatibility etc. We trust that using Synopsys Cloud and collaborating with Synopsys for the development of our current and future SoC designs is the right choice.”

~Charles Wei, Director of SoC Design, TetraMem Inc.