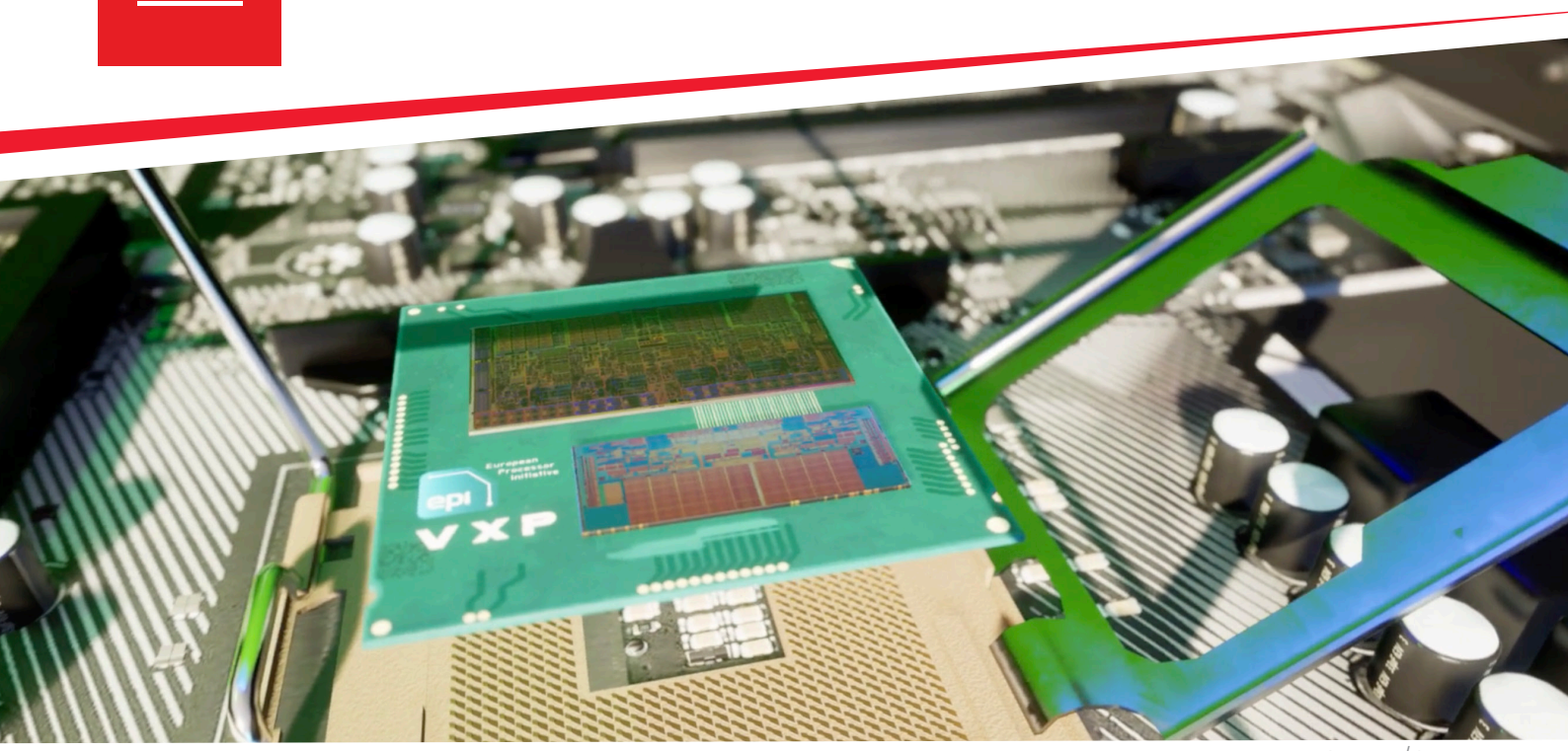

VXP

An extended-precision processor designed for difficult algebraic problems

? WHAT IS VXP?

Precision is particularly important in scientific computing, where it supports stability, consistency, and, ultimately, convergence toward coherent results. In some cases, convergence may even be impossible to achieve without sufficient precision. Ideally, a processor should be able to provide the appropriate degree of precision for the problem—and size of problem—at hand.

The CEA's vXp extended-precision processor is adjustable up to 512 bits. This hardware accelerator slashes computing time between three and tenfold in typical cases while reducing power consumption. With memory sharing and a portable software stack, the vXp is a seamless addition to conventional compute node processors. The vXp is also easy to integrate into data center hardware architectures, either as an accelerator chip on the PCIe bus or as a chiplet on the future UCIe bus. It is also designed to integrate seamlessly into scientific software stacks.

Demo@CES 2024

The vXp demo will include:

- A physical demonstrator showing how much vXp shortens computing time
- A copy of the EPAC test chip with vXp developed as part of the European Processor Initiative
- An interactive display with content users can access via an interactive menu

! WHAT'S NEW?

The vXp processor supports floating-point arithmetic operations up to 512-bit mantissas. The processor's dynamic precision can also be fine-tuned to optimize use of the near-processor memory. This high degree of precision shortens computing times and lowers power consumption. It is designed for ease of integration into data center hardware architectures and scientific software stacks.

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APPLICATIONS

- Scientific computing: computational physics, molecular chemistry, structural calculations, climate models, fluidics, etc.
- AI learning, system dynamics calculations
- vXp is part of the 30-partner European Processor Initiative (EPI)

KEY FIGURES

•Support for floating-point arithmetic operations up to 512-bit mantissas

•Typically speeds up scientific computing by a factor of 3 to 10—more in some cases

•Hardware implementations in the latest 22 nm and 7 nm technology nodes

SCIENCE FOR A BETTER FUTURE

The intensive scientific calculations that are used every day in fields like health, weather forecasting, structural engineering, and molecular chemistry present several challenges the vXp processor effectively addresses.

• Make numerical calculations more stable to ensure convergence toward coherent results when solving difficult problems.
• Reduce the number of iterations to reduce calculation convergence time.
• Simplify the algebraic methods used.
• Eliminate the problem pre-conditioning step for guaranteed reliable results in less time, lowering computer use costs.

>> WHAT'S NEXT?

Our next target is to prototype circuit boards integrating our existing silicon version of the product so that we can increase the computing power and make the prototype available to our partners for testing.

INTERESTED IN THIS TECHNOLOGY?

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