Synopsys' ASIP Designer Tool Enables RIKEN to Successfully Develop Application-Specific Instruction-Set Processor in Less Than Six Months

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Highlights:

- RIKEN used ASIP Designer to develop custom processor for analyzing large biological systems
- Specialized application-specific instruction-set processor executes large-scale molecular dynamics simulation algorithms 30 times faster than existing cores
- Automatic generation of software development kit (SDK) and synthesizable RTL enabled RIKEN to complete the design from concept to implementation in less than 6 months

Synopsys, Inc. (Nasdaq: SNPS) today announced that RIKEN successfully developed its high-performance application specific instruction set processor (ASIP) core for its molecular dynamics (MD) simulator using Synopsys' ASIP Designer tool. By using ASIP Designer, the RIKEN design team developed its specialized ASIP from concept to gates in less than six months while achieving a performance level up to 30X higher than existing processing solutions. RIKEN's large-scale MD simulator system consists of more than 8,000 instances of this specialized processor core, enabling researchers to analyze biomolecular dynamics and functions at a level more realistic than conventional simulations.

"With Synopsys' reputation as the premier provider of ASIP development tools, we were confident that ASIP Designer would enable us to implement our specialized architecture within our aggressive project schedule," said Makoto Taiji, team leader of the Biosystems Dynamics Research Center at RIKEN. "ASIP Designer enabled us to tune the instruction-set to run our specific algorithms 30 times faster than existing processors. This significantly reduces the calculation time needed, from a year to just a few weeks, to simulate important biomolecular interactions like the effect of new drugs."

Synopsys' ASIP Designer allowed RIKEN to use a high-level specification of the processor to quickly model and analyze multiple processor architectures. Using this single input specification written in the nML processor description language, ASIP Designer automatically configured the SDK containing an instruction-set simulator, assembler, linker, debugger and C/C++ compiler, and also generated the synthesizable RTL design. Immediate availability of the compiler enabled RIKEN to run their C application code on the automatically-generated instruction-set simulator. With this unique "compiler-in the-loop" approach as well as the extensive profiling capabilities of the debugger, RIKEN rapidly analyzed and explored ASIP architectures and instruction sets to find the optimal power and performance design points for the target application.

"The ability to customize and optimize processor architectures is extremely important for designers who have application specific requirements that cannot be met by standard processors," said John Koeter, vice president of marketing for IP at Synopsys. "Synopsys' ASIP Designer tool gave RIKEN the ability to explore and optimize processor architectures for their unique computer system and enabled them to achieve superior processing performance, while accelerating the development of their SoC."

Availability and Resources

- The ASIP Designer tool is available now
- Read the success story
- Learn more about Synopsys' ASIP design tools athttp://www.synopsys.com/ASIP

About Synopsys

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