

Synopsys and ARC International

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Andy Elms, Director of Systems Engineering, ARC International

ARC International is in the vanguard of solving System-on-chip (SoC) design issues for customers. Aiming to dramatically cut time to market for its customers, ARC delivers pre-verified blocks of soft IP—processors, peripherals, RTOS and system software that allow developers to pull together much of what they need to create a highly integrated SoC. The user-configurability of ARC's IP components requires a solution that facilitates the verification of the complete SoC—inclusive of the processor core and peripherals.

ARC's customers can generate soft IP designs using the ARChitect™ processor configuration tool, a GUI that literally lets developers point and click to quickly build a custom SoC. Once the SoC design is complete, it is foundry and process independent, which means that customers are free to take their processor into production wherever they choose. “It's important to customers that they have a level of confidence that the IP meets their functional objectives,” said Andy Elms, Director of Systems Engineering, ARC International.

Business

ARC International is a world leader in configurable SoC platform technologies. ARC is a leading developer of embedded user-customizable, high-performance 32-bit RISC/DSP microprocessor cores, with integrated development tools, peripherals, RTOS and software. ARC's integrated intellectual property (IP) solutions assist customers in rapidly developing next generation wireless, networking and consumer electronics products, reducing their cost, time to market, number of IP suppliers, and risk for system-on-chip products.

ARC is committed to providing that confidence, by helping customers solve their verification challenges. When the company wanted to provide their customers with a leading-edge methodology for verifying their ARCTangent™ microprocessor-based SoC designs, Synopsys Professional Services helped them create an environment that is also configurable and portable for delivery to customers.

The best total package

For large, complex SoC designs, verification can be the biggest bottleneck in the design cycle, taking up 75 percent or more of the entire schedule. ARC wanted to improve the productivity of its verification engineers and achieve more complete test coverage for its IP designs with a leading-edge verification methodology. But the company wanted to go even further. "We were not just interested in buying tools," says Elms. "We were interested in a verification flow that would work well for our customers." Among the alternatives that ARC considered, Synopsys Professional Services offered, in Elms words, "the best total package."

Issues

- Demonstrate ARC's microprocessors and peripheral IP working together at the system level
- Increase competitiveness by adding value to IP through reduced risk
- Enable customers to rapidly solve SoC design issues

Solution

- Synopsys Professional Services verification consulting services
- VERA® and VERA CORE verification technology

Benefits

- Improved quality and coverage for system verification
- A deliverable verification environment for ARC IP
- Reduced time to market and reduced risk for ARC customers

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Increasing the quality of system-level verification.

Functional verification is a core competence of Synopsys Professional Services. Synopsys' design consultants apply the latest in verification technology, including constrained random generation of legal stimuli, coverage monitoring, and self-checking testbenches. That's exactly what ARC wanted.

The project started with a review of ARC's current verification environment. Then Synopsys' design consultants worked with ARC to develop a thorough verification plan that set forth the objectives of the new system-level environment, specified what it would do, and defined its architecture. It defined the verification flow, including processes, tools, data input and output, and scripts to automate the flow. The plan also included detailed specification of the testbenches and tests required to ensure confidence in the

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functional correctness of the design. The Synopsys verification methodology stresses verification coverage and testbench reusability. “Synopsys’ expertise was especially valuable to us in creating the specification and the architecture for the environment,” notes Elms.

Synopsys Professional Services also supported ARC with project management for the multinational team working in four countries, and with hands-on expertise during the execution phase. ARC engineers developed the random instruction generator in C++. A combined ARC-Synopsys team used VERA, Synopsys’ comprehensive testbench automation tool for full-system verification, to create a virtual prototype of each peripheral and core, and to generate self-checking tests automatically that mimic real-life stimuli. VERA generates reactive tests using dynamic coverage feedback to guide the stimulus generator. “This project was able to create an environment where you could simulate all parts of the

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A portable verification environment for customers

To give customers the confidence that the IP blocks work together properly at the system level, ARC wanted to share a common, reusable verification environment with them. Synopsys Professional Services provided the solution with VERA CORE. “Now we can deliver IP with a portable, configurable verification environment,” says Elms. Customers can select a particular configuration of the IP and run simulations that match it to verify that the IP is working as expected in the system.

A competitive advantage for ARC

Elms considers the portable verification environment a competitive advantage for ARC. For one thing, the coverage reports show the customer how well the IP has been tested. In addition, configurable, portable testbenches help customers beat the verification challenge and get to market faster with their products. "The challenges of deep sub-micron technology apply to all IP vendors. Providing IP tools like this puts us in a strong competitive position," says Elms.

Conclusion

The project was a success on all counts according to Elms. It met the objectives: It gave ARC's licensees a state-of-the-art verification flow for testing their IP, enabling a faster and more predictable route to market. "The quality of the Synopsys staff is very high and projects are run in a very professional fashion," concludes Elms. "I'm very satisfied with how the project has gone forward."

The logo for Synopsys, featuring the word "SYNOPSYS" in a bold, sans-serif font with a registered trademark symbol (®) to the upper right.

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