SYNOPSYS®

Predictable Success

"A key part of our business model is to rely on FPGAs without having to become experts in the technology ourselves. We've proven that companies can succeed with that model by counting on the Synplify Premier tool, augmented as necessary by the Synplicity support staff, to provide the FPGA-specific knowledge for them."

— Thorsten Last,
Director of Research & IP Development,
Hyperstone AG

Synplicity®

Simply Better Results

Success with the Synopsys® Synplicity® Business Group and Hyperstone

Synplify® Premier Success Story

Summary

Fabless semiconductor manufacturer Hyperstone depends heavily on FPGAs in product development, but does not count FPGA technology among its primary areas of expertise. Therefore the firm's engineers need a strong, stable environment for FPGA physical synthesis that shields them from having to know the details of their Xilinx target devices. Since the team needs to resynthesize RTL on an almost daily basis, ease of use and fast turnaround are essential. Hyperstone found all these qualities in the Synplify Premier product from the Synopsys Synplicity Business Group,

Hyperstone successfully used Synplicity FPGA synthesis technology to perform its vital part of INOS (Intelligent Networked Optical Sensor), a major, multi-company European design project. Hyperstone has found that the Synplify Premier solution saves as much as five months time to market while helping to meet timing and delivering high-performance results.

Contributing the CPU to the Pan-European INOS Project with Help from Synplicity

Hyperstone, a fabless semiconductor company based in Constance, Germany, offers a wide range of microprocessor and microcontroller products that combine a high-speed RISC processor for data and control functions with a powerful DSP unit for fast algorithm execution.

As a key member of Europe's electronics design community, Hyperstone was invited to make a key contribution - the CPU - to the INOS project in which many European electronics design companies partnered to develop a single-package solution for better integration of IT systems with everyday networked systems and services. To fulfill its role in the project, Hyperstone had to provide its CPU as reusable IP, which was difficult using the rigid gate-level language implementation that they employed at the time. To achieve the necessary flexibility, Hyperstone re-implemented the design using synthesizable languages, Xilinx FPGAs, and the Synplify Pro® product from Synplicity for synthesizing designs.

Maintaining Parallel RTL and Software Development Operations, with Daily Iterations

INOS was an unqualified success for all involved, including Hyperstone. The CPU proved to be so strong, in fact, that the firm foresaw a substantial market for ASIC products incorporating it, notably flash memory controllers targeting the solid state disk market.

To bring these ASICs to market as quickly as possible, Hyperstone set up an ASIC prototyping environment that uses FPGAs, again from Xilinx, for prototyping and testing designs. Engineers continually produce new versions of RTL to be tested, and these designs have to be quickly synthesized into firmware for an FPGA motherboard that is employed by software developers. Parallel operations and frequent iterations between RTL and software developers are vital for analyzing optimization opportunities, achieving the best possible performance, and minimizing time to market. Since these iterations occur on an almost daily basis at times, a smooth, stable flow that quickly produces results is essential. In fact, Hyperstone set a goal of establishing a highly automated RTL-to-firmware flow that would be essentially "push-button" after initial setup.

However, Hyperstone faced a significant obstacle in its plan: the absence of substantial FPGA expertise in its technical staff. Without the ability to quickly deal with FPGA issues as they arose, the goal of producing new RTL versions almost daily was untenable. Hyperstone approached its friends from Synplicity with the problem, and they presented the recently released Synplify Premier solution. "Synplicity explained that with its graph-based physical synthesis technology, the Synplify Premier tool embodies such a thorough knowledge of FPGAs' specifics that we don't need to understand them at a deep level ourselves," said Thorsten Last, Director of Research & IP Development. "They also told us about the strong integration between Synplify Premier software and the Xilinx ISE place-and-route tool that quickly produces high quality results. Our prior experience with Synplicity products and people was so strong, and the Synplify Premier message so compelling, that we never considered any other solution."

Closing in on Push-Button Physical Synthesis

With so much Synplify Pro software experience, Hyperstone found it easy to learn the Synplify Premier product without a training course. Soon the team was up and running with the new flow, which turned out to be just as fast and efficient as Synplicity had predicted.

Hyperstone also found that its designs consistently meet timing, that the correlation between predicted and actual results is high, and that it is easier to produce designs that perform at the high speeds required for FPGA motherboard testing.

"We are making excellent progress toward our 'push-button operation' goal," said Last. "Some of our design projects are lengthy, lasting thirteen or fourteen months, but they'd take four or five months longer without the design environment efficiencies that the Synplify Premier tool introduced."

Even when FPGA issues do arise, Hyperstone finds that its partnership with Synplicity keeps their impact to a minimum. "We don't know enough about FPGAs to isolate a problem to Synplicity or Xilinx software and we don't want to waste time trying," Last explained. "So we just call our friends at Synplicity and they take care of isolating it, fixing it if it's in Synplify Premier software, or working for resolution with Xilinx - with whom they obviously have a great working relationship - if it's their problem. Synplicity support is also really good at suggesting workarounds when we need them."

Building FPGA Expertise into the Tool, not the User Community

Already Hyperstone has included its CPU IP in several successful ASIC implementations with the help of Synplicity's technology and expertise, and has many more underway and on the horizon.

"A key part of our business model is to rely on FPGAs without having to become experts in the technology ourselves," concluded Last. "We've proven that companies can succeed with that model by counting on the Synplify Premier tool, augmented as necessary by the Synplicity support staff, to provide the FPGA-specific knowledge for them."

To learn more about the Synplify Premier product, visit http://www.synplicity.com/products/synplifypremier.

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