



CADENCE AND IVIVITY

Incisive Verification IP Reduces Risk, Increases Productivity for iVivity

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Jim O’Connor, vice president of engineering, iVivity

CORPORATE PROFILE

- iVivity makes storage network processor silicon for storage and networking manufacturers that want application-controlled storage connectivity

DESIGN CHALLENGE

- Bring to market iDiSX®, a highperformance, multi-core SoC that combines high integration with low power to accelerate the development of intelligent storage systems
- Leverage proven IP to reduce risk, identify bugs, and accelerate project completion

CADENCE SOLUTION

- The PCI Express IP solution, a plug-and-play component incorporating automatic stimulus generation, assertion checking, and functional coverage at the module, chip, and system levels

CADENCE PRODUCTS AND SERVICES

- Incisive® Verification IP

MEETING THE DEMANDS OF AN EVOLVING STORAGE INDUSTRY

To provide value in the data storage business, system OEMs need to deliver advanced storage access capabilities over standard networking protocols. In turn, manufacturers must support a number of data management technologies such as caching, RAID, and storage virtualization. iVivity has responded to the demands of these OEMs with highly innovative, specialized semiconductorbased solutions. OEMs leverage iVivity technology, most notably the iDiSX storage network processor, to create storage systems with new levels of priceperformance.

Founded in 2000 and based in Atlanta, Georgia, iVivity has made it its mission to provide the essential building blocks of enterprise storage solutions. Their iDiSX processor offers the industry’s first flexible programmable intelligent architecture.

These processors are designed to increase performance while reducing both the cost and complexity of storage solutions.

CREATING A STRATEGY TO REDUCE VERIFICATION RISKS

The verification team at iVivity knew that their verification tasks throughout the development cycle would be far from simple. “iDiSX is a tremendously complex IC,” said Samuelson Samuel, senior verification engineer at iVivity. “It’s a storage network processor, an SoC with seven CPUs on it, and it has millions of gates.” The design features numerous interfaces including the complex PCI Express bus protocol. Samuel and his team determined that they would need to capitalize on any available shortcuts that could help them accelerate the process of verifying complex interface protocols. They turned to Cadence for help.

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Samuelson Samuel, senior verification engineer, iVivity

The iVivity team was already using the Incisive Enterprise Specman Elite® testbench automation solution in their design flow. "A major advantage of using the Incisive Enterprise Specman Elite solution is being able to plug in ready-made verification environments, or IP," said Samuel. "We opted to buy a proven verification environment instead of building one. It's a far faster way to go and reduces the risk dramatically, so why not?"

LEVERAGING INCISIVE VERIFICATION IP PORTFOLIO ENABLES SERIOUS PRODUCTIVITY GAINS

iVivity purchased the PCI Express e Verification component (eVC) from the Cadence Incisive Verification IP portfolio. The eVC is verification IP that allows iVivity to verify all three PCI Express layers. This results in a complete verification environment with full functional coverage and constrained random generation, including error injection.

Using the Cadence IP, iVivity got right to work. "The eVC is very easy to configure and use," said Samuel. "Using the PCI Express eVC is really a boon for our productivity. It enables us to focus on the proprietary value-add of our design instead of devouring time trying to become protocol experts."

Samuel continued by explaining that the iVivity verification team found more than 20 bugs in a very brief time. He indicated that iVivity has been successful in shortening their debug time and claimed that whenever a problem is found, the Incisive Verification IP provides clear pointers to it.

CASHING IN ON RE-USABILITY

Cadence Verification IP can be reused without expending any extra effort. You can simply move from module, to chip, to system level verification. "Moving from level to level with the Cadence Verification IP was completely simple," said Samuel. "We experienced no pains upgrading the blocklevel testbench. In addition, we're saving weeks and weeks of time by adhering to Cadence's Plan-to-Closure verification methodology."

POSITIONED FOR NEXT-GENERATION SUCCESS

iVivity's success can be traced to its first storage network processor, the iDiSX 2000. Moving forward, the company will next bring to market the iDiSX 1000. The functionality of the new chip very much depends on its use of PCI Express. "We've determined that 90% of the risk is in the chip's interfaces," said Jim O'Connor, vice president of engineering at iVivity. "If we design the interfaces incorrectly, it doesn't matter if we get the rest of the chip right. This is especially true with PCI Express since it's such a complex protocol. The bottom line for us is that the choice we made to go with proven IP that's easy to get up and running is really just good solid common sense."

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