

Synopsys and Aristos Logic

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Sanjay Mathur, vice president, engineering, Aristos Logic

Business

Aristos Logic is a leading developer of innovative silicon solutions for the networked storage market and inventor of the Intelligent Storage Processor, which significantly improves performance, manageability, flexibility, and scalability of networked storage through hardware automation of performance critical operations.

Issues

- Intense time-to-market pressure
- Highly complex systems-on-chip (SoC) design
- Start-up company with limited resources

Solution

- Synopsys Professional Services for optimized physical design
- Coordination with ASIC vendor to achieve first-pass success

Benefits

- Shortened cycle-time by several months
- Early time to market for design wins
- Reduced die size for lower manufacturing cost and higher reliability

Making storage a strategic asset

Aristos Logic has a technology to transform storage and how enterprises use it for a strategic business advantage—an intelligent storage processor. Physical design services from Synopsys sped up the introduction of the first prototype, enabling Aristos Logic to beat the competition and capture early design wins.

The data deluge created by the Internet and e-business started a new way of thinking about storage. If computers can be networked, why not storage? Severing the direct server-storage dependency and putting storage on a network where it can be shared offers huge benefits. Storage capacity is utilized more efficiently, reducing costs. Capacity can be plugged into the network without disrupting data access. And LANs are no longer bogged down by high-volume data backups, recoveries, and migrations.

With the advent of storage networking, enterprises now envision an infrastructure that transforms storage into a utility, delivering data from any type of storage device to qualified users, anywhere, any time. Storage is emerging as a strategic asset for new applications and business solutions.

The chip that changes storage

Aristos Logic is helping to turn this vision into reality with a single piece of silicon—the FibreSlice™ Intelligent Storage Processor. This processor is designed specifically to increase performance and simplify management in storage network environments.

Taking into account the asymmetrical nature of storage networks in which host and disks are not peers, the FibreSlice Intelligent Storage Processor accelerates all storage commands. It automates all host requests to logical volumes, processing them in steps that are pipelined and executed in parallel by programmable hardware engines. These engines perform all tasks necessary to complete host requests: communicating with hosts and external storage, terminating and redirecting commands, managing cache, mapping logical to physical volumes, and performing all RAID functionality. The end result is impressive gains in performance. The FibreSlice processor slices through I/O chokepoints; slashes response times to users; speeds storage data services such as snapshot, migration, and remote copy; and enables storage networks to handle the swelling volume of data traffic.

The FibreSlice Intelligent Storage Processor also represents a breakthrough in network storage manageability. While storage networking is a simple idea, networks of heterogeneous devices have been complex and difficult to manage, and virtualization, which promises to make storage resources easy and flexible to

pool, provision, and deploy, has been elusive. The FibreSlice processor collects real-time traffic and performance statistics essential for achieving a managed enterprise storage solution.

A powerful building block for RAID and virtualization systems, Aristos' FibreSlice Intelligent Storage Processor has the potential to transform the network storage industry.

It is easily adapted to a variety of host, disk, and back-plane interfaces and it is used in any number of storage area network (SAN) products. It radically simplifies designs, compresses design cycles, and reduces risk and development cost, while giving system manufacturers the flexibility to add value and create differentiated products. The result is faster introduction of innovative solutions to meet customers' needs for a strategic storage infrastructure.

"With a technology this powerful, the challenge for us was to get to the marketplace fast and capture the main share of the tremendous opportunity," said Adam Zagorski, Director of Marketing. The company needed to demonstrate that the chip worked and secure a place in manufacturers' new product designs as early as possible. This would shorten the time to revenue and win all-important investor confidence for the start-up company.

Aristos Logic met this challenge with the aid of Synopsys' physical design services. "We chose Synopsys Professional Services to obtain a time-to-market advantage," said Sanjay Mathur, Vice President of Engineering. "Synopsys helped us accelerate getting our product into customer hands and lock out competition from design wins."

The time-to-market advantage

As a start up, Aristos Logic had to be smart about applying its resources. While it focused on customer problems and inventing the Intelligent Storage Processor technology to solve them, the company planned to outsource the physical design of the multi-million-gate ASIC.

"If we had the luxury of a larger time window, we could have followed the traditional ASIC model and worked with the silicon manufacturer directly ourselves, but we didn't have that luxury," said Mathur. Under intense schedule pressure, Aristos Logic leveraged Synopsys' expertise in physical design to compress and speed up layout cycles. "Synopsys knew our ASIC vendor's tools and flows and worked closely with the vendor to create an accelerated design flow," explained Sharon Yu, Director of ASIC Engineering.

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Sharon Yu, director of ASIC engineering, Aristos Logic

The accelerated physical design flow saved three to four months, and Aristos Logic had functional silicon for the first prototype in just 10 months. Far ahead of any competition, Aristos Logic has seized the advantage. “On the strength of the first prototype, we are actively in customer design engagements with several customers, and in the process of helping them design their systems using the chip,” said Zagorski.

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Radically expediting physical design

How did Synopsys Professional Services overcome the challenges and make the task possible?

One, they gave Aristos Logic the peace of mind and confidence of greater direct control over the physical design process. Synopsys offered the depth of resources to apply flexibly, as needed, to substantially reduce the risk of schedule slips.

Two, they worked closely and flexibly with Aristos Logic. Sometimes that flexibility meant Synopsys experts went to Aristos Logic to learn about the chip architecture. Sometimes it meant working with Aristos Logic at Synopsys’ facilities, where there was access to research and development resources as well as tools and computers. “One of the things we really valued about Synopsys was their openness and flexibility in working according to whatever model was best suited for us.”

Three, they streamlined and expedited communication between Aristos Logic and the silicon manufacturer. Because Synopsys already knew the vendor processes and flows, no time was wasted educating each other. Problems were quickly solved collaboratively.

Four, Synopsys experts brought to bear extensive experience with the most complex designs and a thorough understanding of the challenges of ultra-deep sub-micron technology. They minimized logic and interconnect delays, eliminated signal crosstalk, solved voltage drops, and minimized clock skew, preventing problems that could have degraded performance and impaired manufacturability. Because they were able to account for all the physical effects concurrently throughout the design process, they achieved design convergence and timing closure in the fewest number of layout cycles.

“The Intelligent Storage Processor replaces four or five chips. It was a difficult challenge to integrate all that functionality in such a small die size,” said Zagorski. Not only did Synopsys meet the challenge, but they optimized placement and routing so effectively that Aristos Logic has been able to reduce the size of its first production chip, in turn lowering manufacturing cost while improving reliability.

Conclusion

Mathur sums up the value of the Synopsys contribution this way. “We radically expedited the layout cycle time by going to Synopsys. Because of the shorter cycle time, we managed to get the design wins. We are in designs that may have gone to our competition if we weren’t there at the right time.”

For more information about Synopsys Professional Services visit us on the Web at www.synopsys.com, contact your local sales representative, or call 1.866.537.6654.

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