

Synopsys and Solarflare

Solarflare Achieves First-Pass Silicon Success for 10/40G Network Controllers with DesignWare IP for PCI Express 3.0



Using high-quality DesignWare IP for PCI Express for the last ten-plus years has helped assure our success in the competitive networking market.”

Derek Roberts

Vice President of Hardware Architecture, Solarflare

Business

Solarflare is the leading provider of application-intelligent networking I/O software and hardware that accelerate, monitor and secure network data. They are a pioneer in high-performance, low-latency 10/40GbE server software and hardware network solutions. The company's products are widely deployed in server environments used for cloud, virtualization, electronic trading, and big data.

Challenges

- ▶ Integrate fully featured PCI Express® 3.0 IP that includes support for SR-IOV
- ▶ Engage with a reputable IP vendor that can meet Solarflare's needs for custom IP extensions
- ▶ Accelerate time-to-market by selecting mature, easy-to-integrate PCI Express IP

Synopsys Solution

- ▶ DesignWare® Controller IP for PCI Express 3.0

Benefits

- ▶ Achieved first-pass silicon success and significantly accelerated time-to-market
- ▶ Acquired market-leading SR-IOV technology in a fully PCIe®-compliant IP product
- ▶ Met aggressive schedule with help from an experienced support team

Overview

When developing the latest in their series of Flareon network controllers, Solarflare needed to deliver industry-leading packet rates with low latency over standard Ethernet to enable excellent performance and scalability for enterprise data center environments. Using a single SoC design for several products, Solarflare required flexible interfaces to meet the varying needs of multiple applications. Solarflare supports applications like Linux® KVM, VMware® ESXi, and Citrix® XenServer®, which require SR-IOV to allow their customers to direct traffic to more CPU cores in a virtualized environment. Using SR-IOV enables a smaller number of adaptor boards, better utilization, less bottlenecking in the server, and more predictable workloads.

To support these objectives, Solarflare required compliant PCI Express 3.0 IP with market-leading SR-IOV technology. After evaluating several IP vendors, Solarflare determined that only Synopsys offered high-quality PCI Express 3.0 IP with SR-IOV. Furthermore, Solarflare's decade-long use of multiple generations of Synopsys PCI Express IP assured them that the IP would meet their requirements and that Synopsys could support Solarflare's needs for IP extensions. "We needed to have high confidence in our IP vendor's ability to deliver extensions on time, and with high quality," said Derek Roberts, Vice President of Hardware Architecture, Solarflare. "Given the complexity and criticality of PCI Express IP in our application, selecting Synopsys was the only sensible option."



“Realistically, the PCI Express specification is so complex that it’s not viable or wise to build our own PCIe IP. We needed a vendor that we could count on to deliver high-quality IP, and only Synopsys offered the IP maturity and feature set that we required.”

Derek Roberts

Vice President of Hardware Architecture, Solarflare

High-Quality DesignWare IP

When designing network controllers, time-to-market and reliability are critical. Solarflare planned to use the PCI Express 3.0 IP in several different SoCs, so selecting IP with a track record of first-silicon success would help them get to market on schedule with reliable, high-performance products. In addition, Solarflare required PCI Express 3.0 IP with SR-IOV technology, as well as a vendor who could support their requests for special IP add-ons and extensions.

“Selecting IP is a multi-faceted process,” said Roberts. “Not only must the IP offer the quality, performance, and feature set we know that we need today, the vendor must prove that they will be able to offer the support and flexibility we may need later in the project. In addition, the vendor must have a history of on-time delivery. Synopsys offered the PCI Express 3.0 IP with SR-IOV that we needed when we were sourcing the IP. In addition, we knew that Synopsys is committed to our success for this and future products. Integrating DesignWare IP for PCI Express 3.0 ensured that the IP would perform as expected to help us meet our aggressive time-to-market schedules and high performance requirements.”

Easy Integration and Responsive Support

Solarflare found that integrating the DesignWare IP for PCI Express 3.0 was very easy, especially due to Solarflare’s long experience with the DesignWare IP. “As the PCI Express specification moves from one generation to the next, we know that we can count on Synopsys to be duly circumspect about making unnecessary changes,” said Roberts. “By using Synopsys, integrating the IP is not a major part of our design work.”

When assistance was needed to develop IP extensions, Synopsys’ knowledgeable and responsive technical support was ready to help. “The high quality of our relationship with Synopsys extends into our great access to Synopsys’ excellent technical support team,” said Roberts. “We are always pleased with the interaction.”

“We are already designing-in DesignWare IP for PCI Express for our next project and plan to tape out the chip this year,” said Roberts. “Synopsys is definitely on our short list for PCI Express 4.0 IP as well.”



Figure 1: Solarflare Flareon 10/40G Network Controller with DesignWare IP for PCI Express 3.0