Virtex-5 Serial Connectivity Solutions

Enabling unconstrained product development for the triple-play market.

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Although "triple play" may be one of the hottest buzzwords and growth drivers in the semiconductor industry, it is insightful to understand the evolution of the technology that was required to realize triple play, the forces behind its explosive growth, challenges that will occur along the way, and the critical role of Xilinx® Virtex™-5 products in the development and deployment of triple-play products and services.

Central to the Virtex-5 platform's value is the recent emergence of two serial I/O standards: Gigabit Ethernet (GbE) and PCI Express (PCIe). In the last three years, these two interfaces have become the defacto connectivity standards for network and computing applications; according to Electronic Trend Publications, GbE and PCIe will account for 80% of all port shipments in 2009.

Disruptive Technology

IP is clearly the preferred protocol in the network market as telecom vendors and service providers transition to an all-IP-based infrastructure supporting Voice over IP, Video over IP, and Data over IP (also known as triple play). Designing carrier-grade to end-user products that support triple play is very challenging, as these products must achieve high levels of performance, manage quality of service (QoS), and be power-efficient and flexible enough to adapt to the seemingly endless evolution of standards and protocols.

In the computing infrastructure market, PCIe has become the predominant host interface for networking, graphics, and backplane connectivity because of its quantum leap in performance, scalability, and pin-count efficiency over the legacy PCI bus. Designing products that span network and compute infrastructures like those in triple-play markets requires system architects and engineers to be well-versed in these new domains, introducing new risks. To this end, Xilinx embarked on a project two years ago to mitigate design risk by introducing a new generation of Platform FPGAs that substantially increase performance, functionality, and device density while reducing cost per gate.

Next-Generation FPGAs

Leveraging our core competence as the premier FPGA vendor and working with our world-class customers and partners, Xilinx developed the Virtex-5 FPGA architecture. With the introduction of the LXT family, Virtex-5 devices now feature integrated multi-GbE and PCIe connectivity technology ideally suited to designs for the triple-play market.

This LXT family is equipped to support high-speed serial connectivity, with features that include:

- Built-in GbE MAC – each Virtex-5 LXT device features four hard-core GbE MACs for multi-port Ethernet connectivity
- Built-in PCIe block – an integrated standards-compliant PCIe Endpoint block supporting one to eight lanes provides as much as 32 Gbps of full-duplex host I/O for extreme performance applications

These features reduce the engineering effort spent on resource utilization, troubleshooting connectivity issues, minimizing power consumption, and optimizing performance, thus giving our customers unconstrained Virtex-5 FPGA resources in designing infrastructure and end-user products for delivering voice, video, and data over IP.

As a programmable platform, the Virtex-5 family positions our customers and partners to enable value-added triple-play technologies such as:

- QoS – customer-specific traffic management solutions enabling tiered services that can change with market conditions
- Digital rights management – enabling hardware-based, adaptive, end-to-end data security for the wide diversity of standards inherent to these markets

Conclusion

In the very dynamic consumer industry where time to market with flexible services is the name of the game, companies are still trying to figure out the right mix of products and services to generate substantial revenue. The Virtex-5 LXT family integrates world-class programmable logic architecture with embedded serial connectivity, providing the performance, density, and connectivity required for delivering voice, video, and data in the emerging triple-play market.