

Scoping the Next Killer App – Triple Play

How consumers are influencing the Xilinx roadmap.



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Xilinx began its market diversification efforts in earnest in early 2001, at a time when the communications industry – representing more than 80 percent of our revenues – was clearly declining. We began by establishing a team of experts in six targeted markets: aerospace/defense, automotive, broadcast, consumer, industrial/scientific/medical (ISM), and wired/wireless.

Simultaneously, we sought to elevate the strategic fit of our solutions into multi-generational applications within the communications and storage and server markets. We then focused our efforts on developing products and solutions specifically to meet the demands of these key markets, both from a cost and performance perspective.

This strategy required Xilinx to rethink its product roadmap strategy and establish a more system-level architecture and solutions-based approach to next-generation products. Thus began our transformation from an industry-leading silicon supplier to a market-driven solutions enabler.

Although the majority of semiconductor manufacturers addressed the industry downturn through significant layoffs, Xilinx reorganized its resources and strategy to focus on market diversification efforts. We combined our approach with an aggressive migration down the process technology curve, setting our sights on 90 nm. Historically, programmable logic devices (PLDs) were not a cost-effective solution for high-volume, price-sensitive applications. To compete in the larger \$44 billion ASIC and ASSP market, we understood the need to reduce the price of our product offerings.

This revolutionary approach to the infamous market decline was extremely successful. Today, more than 45 percent of Xilinx® revenues can be attributed to these vertical market segments, and a one million gate device, formerly priced in the thousands, can now be purchased for as little as \$8 (based on a 500,000 unit volume, second half 2006, -4 speed grade, commercial temperature, lowest cost package option). In addition, revenues for our high-volume Spartan™ FPGA family grew from less than 2 percent to more than 24 percent of Xilinx total revenue in just four years, with the majority of that revenue realized in targeted diversified markets and applications.

Going Forward: The Triple-Play Opportunity

The triple-play opportunity has a huge role in our strategy to further penetrate these key vertical markets. What exactly is triple play? Triple-play service is a marketing term for the provisioning of three services: voice, video, and data, over a single broadband (IP) connection. The Internet has emerged as a key infrastructure for service innovation, enabling IP to become the wide area network communication it is today. Over the next decade, as consumer demand increases for triple-play services, network planners must engineer broadband aggregation networks to reach new thresholds of scalability, performance, and quality of service (QoS). Experts agree that the aggregation of services over IP will transform the way we work, live, and play.

The expansion of residential services beyond high-speed Internet will require a revitalization of network infrastructure and operations. Aggregation bandwidth requirements are expected to increase 10 to 100-fold, ultimately requiring 20-50 Mbps per channel to deliver these new services.

This network infrastructure overhaul creates an amazing opportunity for the semiconductor industry across a wide range of vertical markets, including

wired/wireless communications, consumer, audio/video/broadcast, storage and servers, and ISM. Each of these markets will need to develop new products and services to satisfy consumers' hunger for more bandwidth.

The Xilinx Value Proposition

Consumers face a vast array of choices to satisfy their need for communications, entertainment, and information; loyalty to any one service provider is dwindling. In an effort to expand revenue sources and enhance customer loyalty, telecommunication providers are juggling new regulations and enabling technologies to compete with cable service providers.

There is fierce competition as each strives to deliver superior services through product differentiation. The architecture must be optimized for sustained high-bandwidth demand and must be cost-effective at both ends of the scale. The network must also allow operators to incrementally introduce new features. Time to market, design flexibility, and reprogrammability are essential. Because PLDs offer all of these benefits, Xilinx is poised to capture much of this vast market opportunity (Figure 1).

According to Bob Wheeler, a senior analyst for The Linley Group, "The accelerating trend towards convergence is mak-

ing packet processing and the ability to ensure IP QoS an increasingly mainstream requirement in communications infrastructure equipment, ranging from broadband access to metro core and wireless. We anticipate the market for packet-processing silicon to grow significantly over the next few years as IP continues to displace ATM. By providing a high-performance, scalable, and flexible traffic management solution, Xilinx is well positioned to address the increased demand for triple-play services."

A number of technical challenges exist with regards to the rollout of triple-play services. Voice, video, and high-speed data all have different characteristics and place different burdens on the network. Voice services are greatly affected by jitter, whereas packet loss or packet reordering has a greater affect on video and data services.

Using a shared resource such as cable or DSL requires the network to employ QoS mechanisms. In response to this demand, Xilinx recently announced a solution to enable QoS support and efficient bandwidth utilization in 10G metro, broadband access, and wireless systems. The Virtex™-4 FPGA-based solution, jointly developed with Modelware Inc., provides product developers with a high-performance, scalable, and flexible approach to integrating advanced traffic management features into

networking infrastructure equipment. By using the traffic manager solution, equipment vendors can quickly deliver cost-optimized products that ensure QoS and efficient bandwidth sharing when sending voice, video, and data simultaneously over a converged IP network.

Key benefits of the hardware-based traffic manager include high-performance throughput support from 50 Mbps to 10+ Gbps, allowing the solution to be used in high-end equipment such as metro core routers and in wired and wireless access equipment such as PON OLTs and WiMAX base stations. Scalability and flexibility are provided through support for 2 to 1.2 million queues (256K queues/level maximum), 1 to 5 levels of scheduling, and 1 to 64,000 multicast groups.

The solution also supports a diverse set of algorithms for policing, shaping, scheduling, and congestion avoidance and control. To achieve high integration and cost optimization, the traffic manager can be combined with custom logic, embedded IBM PowerPC™ processors, and multi-gigabit transceivers to provide a total custom solution. The traffic manager supports multiple memory configurations comprising embedded block RAM and a variety of external SRAM/DRAM memories. This allows for the most optimized hardware implementation in terms of cost and performance.

A Market-Driven Strategy

To take full advantage of the triple-play opportunity, Xilinx will continue to take a market-driven solutions approach to its strategy, solutions, and product portfolio as we strive to gain a thorough understanding of the specific needs of each target market.

PLDs have become a ubiquitous technology, one that has been key in catalyzing the rapid growth of a wide range of new markets and applications. Evolving from an off-the-wall technology to one that is pervasive and mainstream, PLDs today are enabling a wide spectrum of exciting end products in all vertical markets. We hope to help our customers achieve exciting technological breakthroughs and create bold new applications leveraging innovations from Xilinx, through both our silicon and our solutions.

Triple Play: The Opportunity Voice, Data, Video over IP

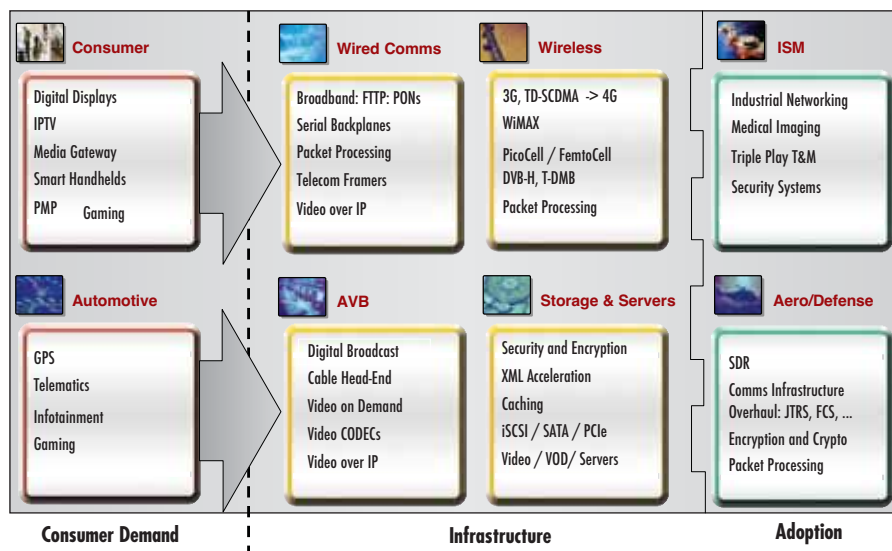


Figure 1 – Triple play in the context of key vertical markets