Forward:
Don’t miss this Issues links to many of the recent News Releases and Published Articles. We have seen a significant number of announcements of RapidIO being used in new and exciting applications like Video Conferencing. The introduction of new Gen 2 RapidIO Switches from IDT, and a number of single board computers with the Intel® Core i7 Processor Family. Featured in this issue, an insightful look; at the Evolution of Wireless Standards and how RapidIO is providing leadership in those applications, by CommAgility. -Tom Cox.

In This Issue

• Association News
RapidIO Gen2 Keeps Pace with Evolving Wireless Standards
By Edward Young and Paul Moakes, CommAgility (www.commagility.com)
http://www.rapidio.org/education/resources/RapidIO_Success_Story_vol_2.pdf

• Industry Insights
RapidIO Technology has all the critical features
By Tom Cox, Executive Director, RapidIO Trade Association

• Technical Insights
xTCA Can Handle Demanding Real World Applications
By Tom Roberts and Mike Katz, Mercury Computer Systems
http://www.atcanewsletter.com/English/Newsletters/2011/Articles/201102_Article_TomRoberts.html

• In the News
The RapidIO Trade Association, its members and their products continued to make news in the industry. See Below for links to the recent PR and Published Articles.

• Connect and Contribute
RapidIO Connections welcomes your comments, ideas, questions and contributions.
Industry Insights

RapidIO Technology has all the critical features
By Tom Cox, Executive Director, RapidIO Trade Association

In identifying the critical requirements of the RapidIO architecture as an open standard fabric, the RapidIO Trade Association examined what features were needed that would provide more extensive technical benefits than the proprietary solutions in production today, plus provide the benefits of an open standard. These features included:

- Architectural independence
- Carrier grade
- Advanced traffic management
- High performance
- Scalability
- The Right ecosystem

These fabric features are discussed in the following sections.

Fabric Requirement #1: Architectural Independence

A fabric must not be tied to a particular hardware or software architecture. Ethernet is an example of a technology with a high-level of software dependence. An application generally cannot access an Ethernet packet without running a networking stack. Similarly, some architecture intrinsically suffers from a high-level of hardware architecture dependency. For example, transmitting an architecturally independent entity (like a packet/cell/frame, RDMA) over an architecturally dependent memory mapped bus (that uses a common address space for all devices) runs counter to the natural forward evolution of architectures.

An effective fabric must also support direct peer-to-peer transactions and not be tied to a particular network topology (such as dual-star, mesh, ring, daisy-chain, or tree). In particular, interconnects that function in a tree topology force all transactions to flow through a common switch or CPU complex, which is not optimal for a fabric. A fabric must also support the spectrum of chip-to-chip, board-to-board, mezzanine, backplane and chassis-to-chassis mechanical standards.

Finally, a fabric must have a simple and clean separation between its physical, transport and logical layers. It must be easily extendible so that new features can be added without breaking the integrity of the original architecture.

RapidIO technology was designed to be flexible and agnostic in terms of network architectures and protocol support. In addition, the layered RapidIO architecture is extensible and adaptable, enabling new features and physical layer technologies to be implemented without disrupting the integrity of the architecture.

Fabric Requirement #2: Carrier Grade

A fabric must be reliable and robust. It must support performance management features, which allow a fabric manager (typically a host processor) to investigate and monitor the status of the fabric. The fabric must contain semantics for event notification and handling.
The fabric must support common fault management scenarios such as failure detection, hot swap, redundancy and fault tolerance. RapidIO technology embodies the notion of reliability. It supports robust error detection with hardware-based recovery mechanisms. At the physical layer, each packet is explicitly acknowledged on a link-by-link basis. Packets are covered end to end with a Cyclic Redundancy Check (CRC).

**Fabric Requirement #3: Advanced Traffic Management**
A fabric must be able to support Classes of Service (CoS). Traffic classes have unique requirements: some classes are sensitive to latency (voice and video), some classes are bursty (data), other classes have minimum or maximum throughput profiles (service level agreements). Fabric architecture must support classes in order to capture the full semantic of the class fields of common networking protocols (IPv4, IPv6, etc). Interconnect architectures that do not support classes, may be quickly outgrown as protocols like IP continue to evolve new uses for their traffic class semantics. Additionally, a fabric must support millions of flows. Lastly, a fabric must support end-to-end flow control. Traffic sources can, for example, send a large overwhelming burst of traffic to a PHY. In this canonical case, traffic can back-up within the various buffers and FIFOs within the fabric, and block critical pathways.

**Fabric Requirement #4: High Performance**
Advanced traffic management features directly contribute to fabric performance. Traffic management can prevent a burst of packets from causing a fabric to block. This is critical to maintaining performance. Traffic management can also enforce performance guarantees for specific classes or flows. RapidIO advanced traffic management enables predictable low latency performance.

**Fabric Requirement #5: Scalability**
Scalability is related to performance, but it is broader. A fabric must be able to scale in the throughput domain: from very low-cost, low-power applications all the way up to very high-end, high-throughput systems. The Serial RapidIO physical layer supports three speeds: 1.25, 2.5, 3.125, 5 and 6.25 GHz. Engineers intuitively understand that higher speed clocks imply higher power consumption. RapidIO technology is unique in allowing the user to scale the speed of the physical layer to support power sensitive applications. Fabrics must also support thousands of end-points in order to scale to the needs of high-end applications.

**Fabric Requirement #6: The Right Ecosystem**
One common myth is that embedded and communications systems design with the same parts as commercial desktops, laptops and servers. In fact, quite the opposite is true. If one were to compare the bills of materials of a commercial desktop PC with a VME or ATCA motherboard, for example, the two would share very few actual components. The reason is that the embedded and communications markets have specific non-negotiable needs: long product life cycles, industrial qualification and reliability, and industrial temperature ranges. Solutions that are targeted at the commercial markets categorically do not address these requirements. The RapidIO Eco-System has grown over the past ten years to be one of the most robust sources of components supported by the world leading suppliers.

The RapidIO architecture presents a strong value proposition in seeking to win the backplanes and fabrics of today’s equipment. With the help of extensions and Generation 2, RapidIO technology can scale from very cost/power sensitive low-end local bus applications to highest-performance fabrics requirements.
In the News

The RapidIO Trade Association, its members and their products continue to be sought after news in the industry.

- Curtiss-Wright Controls 8GB Buffer Memory XMC Card Supports both SRIO and PCIe Interfaces 23 Dec 2010
- IDT Expands Industry-Leading RapidIO® Gen2 Switch Portfolio 29 Mar 2011
- IDT RapidIO® Gen2 Switch Selected for High Speed Interconnect on Texas Instruments’ TCI6616 Wireless Base Station Evaluation Module 24 Mar 2011
- IDT RapidIO® Switch Selected by RADVISION for SCOPIA Video Conference System 08 Mar 2011 RapidFET releases Version 3.0 21 Feb 2011
- Mercury Computer Systems Provides Integrated ATCA Subsystems In Support Of Cutting-Edge South Korean 4G Telecommunications System 18 Feb 2011
- Curtiss-Wright Controls Introduces 2nd Generation Intel® Core processor family-based 3U OpenVPX Single Board Computer 07 Jan 2011
- Curtiss-Wright Controls Introduces Its First OpenVPX Multiprocessing DSP Engine based on the 2nd Generation Intel® Core i7 Processors 06 Jan 2011
- Mercury Computer Systems Launches High Performance Products for Defense Applications Based on the 2nd Generation Intel® Core Processor Family 05 Jan 2011

In the Spotlight:

An abundance of articles focusing on designing with RapidIO technology have appeared in the past months. Below, we’ve included links to some of the best.

- xTCA Can Handle Demanding Real World Applications ATCA Newsletter 07 Apr 2011
- RapidIO Generation 2 - Part III ATCA Newsletter 07 Apr 2011
- RapidIO Generation 2 - Part II ATCA Newsletter 09 Feb 2011
- Developing High-Speed LTE Applications ATCA Newsletter 09 Feb 2011

Connect and Contribute

RapidIO Connections welcomes your comments, ideas, questions and contributions.

---

RapidIO® is a registered trademark of the RapidIO Trade Association. Product and company names mentioned may be trademarks and/or registered trademarks of their respective holders.