

# AdvancedTCA: The effect beyond telecom

By *Todd Etchieson*

**T**elecom Equipment Manufacturers (TEMs) and service providers are realizing the benefits of incorporating standards-based, off-the-shelf components and systems into their designs. Improved time-to-market and economies of scale, reduced development costs, long life support, and a strong supply chain are benefits that could transfer to market segments including medical imaging, security appliances, industrial automation, and military applications. This article will outline issues faced by TEMs developing products for these segments and how AdvancedTCA can help.

In 2005 and 2006 many companies will conduct large-scale lab testing and in many cases begin commercial deployment, gearing up for broad deployment in subsequent years. Supporting this thinking are estimates from many sources that shipments of AdvancedTCA-compliant products could reach \$60 million in 2006 and hit the \$1 billion mark by 2009.

Some consider development of the standard, and availability of products, as further proof that the convergence of telecom and computing, which the industry has talked about for so many years, is finally happening. Designing the standard from the ground up has required TEMs and others involved in the process to do an incredible amount of heavy lifting.

Rigorous design and development schedules followed by painstaking testing have led to a variety of standard-compliant products being delivered today. In light of this, can companies developing products used in medical imaging equipment, security appliances, and military applications (among others) benefit from the pioneering efforts of the telecom industry? With the convergence clearly underway, the lines between computing and telecommunications products and applications have blurred. For example, today medical imaging equipment produces digital images, which are then uploaded to a computer and transmitted to a specialist for diagnosis. It is not a big leap to imagine this same process being done from a single machine (medical image, image processing, and communications). Are there other industries that could, or should, be part of the AdvancedTCA innovation wave?

## A new revolution?

It's no surprise that if you modularize components – and standardize across modules – you end up with multiple vendors that provide compliant, interoperable solutions. AdvancedTCA could be compared to the PCI standardization that revolutionized the PC market. Companies such as IBM standardized on the PCI bus, and Microsoft followed suit with their plug-and-play drivers and interfaces. Today, users can use a variety of VGA cards from different vendors and be assured compatibility with their PCs.

AdvancedTCA defines the mechanics, interconnects, and management of implementing very highly compute- or I/O-intensive applications, or a blend of both. Equipment based on the architec-

ture offers increased flexibility with an environment that allows expansion as needed. Developers can use a “mix-n-match” approach combining various functions, allowing a choice of best-of-breed components including chassis, blades, and Advanced Mezzanine Cards (AdvancedMCs). AdvancedMCs make modular multiprocessing possible by supporting modular computing features such as hot swap and board management, among others. And they can increase power and provide a broader range of high-bandwidth interconnect options.

Figure 1 shows an AdvancedTCA reference model that could be modified for a variety of applications at the platform level. For example, in military products the platform would include CPUs and data acquisition modules. For medical equipment, image processing and compute modules, and for telecommunications, the platform would include line cards, packet processing engines, and compute modules.

Capacity can be added to the platform during operation by adding or replacing existing hardware with more advanced, higher density blades. The form factor and variety of modular AdvancedMCs available today enables complete advanced applications on one card. Equipment manufacturers can use the same architecture to construct a variety of products, improving economies of scale.

## From telemedicine to aerospace

Telemedicine can offer huge advantages, allowing medical professionals to quickly and accurately diagnose and treat serious conditions remotely. Today, high-quality images can be transmitted over networks, enabling real-time interaction between doctors in different locations. Doctors can address medical problems and treat patients more efficiently. Keeping up with technology advancement is a challenge, but by standardizing on AdvancedTCA, manufacturers could avoid a complete re-engineer of existing medical imaging equipment. With slight modifications to existing products, during manufacturing or in the field, equipment could be updated with the latest technology to accommodate advancements that meet users' evolving needs.

Enterprise security is another area where AdvancedTCA can have a positive impact. Network security appliances are growing in popularity. And whether they address an enterprise with a growing mobile workforce or one that incorporates government intelligence centers housing highly sensitive material, securing proprietary data is a challenge. Spam, hackers, viruses, worms, and packet sniffing keep IT managers awake at night. As security threats increase in speed, complexity, and volume, IT managers need to efficiently and cost effectively implement technology network wide. And, IT organizations are under extreme pressure to maximize the space these appliances need. Again, in an AdvancedTCA environment security appliances can easily be updated to address new, more complex security threats by simply adding or switching blades as needed. Its form factor allows blades to be installed horizontally,

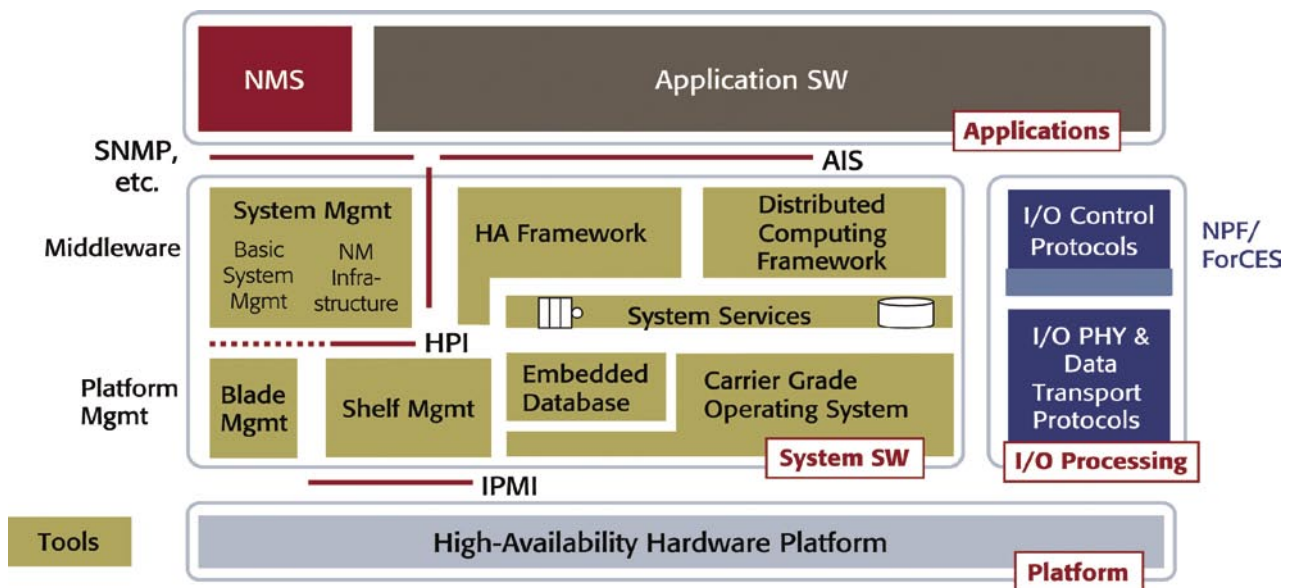


Figure 1

so that functionality that would typically reside in a 12U rack can fit into a 2U-4U configuration.

The military/aerospace market is a candidate for AdvancedTCA and would be a natural progression from VMEbus, the current standard used. While VMEbus has served the market well, there are limitations. The mil/aero world is known for producing rugged, reliable products that require significant processing power and are in the field for years. This long life cycle means this equipment needs to be easily upgradeable as processors and interconnect technologies evolve. AdvancedTCA can offer the same functionality the military/aerospace market has grown to love with VME, but also allows them to upgrade to next-generation technology as needed.

In each case, keeping up with ever-changing technology can test even the most advanced organizations. What is clear is that most market requirements are driving faster processors, communications, and lower prices.

Continuing forward with proprietary technology to meet these rapidly developing market requirements is no longer sustainable. Using proven, interoperable, off-the-shelf components from compliant vendors allows manufacturers to easily adapt products to changing requirements faster and more cost effectively.

Design teams working on next-generation computing products and applications should have a basic understanding of the benefits

a common architecture for product development. Especially as the convergence continues, what operates as a standalone product today could become dependent on the network tomorrow.

Standards play an important role, ensuring interoperability and stimulating economies. Multivendor solutions also allow expansion into related markets enabling vendors to gain new customers and ultimately more revenue. For example, firms producing AdvancedTCA components and systems for the military/aerospace market may use this as a path into the medical equipment market.

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